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Stennis Space Center, Mississippi 39529-5004

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KRMS SSM/I Validation March 1988 Quick Look Report

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19. ABSTRACT (Continue on reverse if necessary and identify by block number) The K _a -band Radiometric Mapping System (KRMS) was flown in support of the NASA SSM/I validation program from 6 to 14 March 1988. Data were collected on each of four days during this period. This report provides the flight and navigation records required to reconstruct the missions. Flight tracks, compiled from the primary navigation system, indicate areas of coverage. The system logs provide the sensor settings and pertinent flight data, such as altitude and ground speed. The navigation logs provide specifics as to location of data and time of collection. A flight track chart is provided for each day's mission. Several examples of KRMS imagery are also provided.					
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KRMS SSM/I Validation March 1988

Quick Look Report

L. DENNIS FARMER,* DUANE T. EPPLER,* BRUCE HEYDLAUFF† and DAVID A. OLSEN**

INTRODUCTION

The K_a-band Radiometric Mapping System (KRMS) was installed on Naval Research Laboratory (NRL) aircraft UP-3A (BUNO 150607) on 2-3 March 1988. Installation was accomplished at the Naval Weapons Center, China Lake, California, under the direction of Bruce Heydlauff. There were no problems encountered and the deployment to Alaska began on schedule on 6 March.

The primary objective of this mission was to provide high-resolution passive microwave imagery in support of the NASA SSM/I sea ice algorithm verification program. Four flights were flown, originating from Eielson AFB, Fairbanks, Alaska. Flight 1, 8 March, was in the Chukchi Sea region, north of Cape Lisburne (Fig. 1), and was unaccompanied. Flight 2, 11 March, was a transect over the Beaufort Sea from the north coast of Alaska and north of the Canadian Archipelago (Fig. 2). Flight 3, 13 March, was over the Bering Sea between St. Lawrence Island and St. Matthews Island (Fig. 3). Flight 4, 14 March, was in the Chukchi Sea region (Fig. 4), northwest of Barrow, Alaska. Flights 2, 3 and 4 were flown in company with the NASA DC-8 remote sensing aircraft.

A secondary objective of the mission was to obtain coverage of the Tanana River and several lakes in the Fairbanks area for a research program sponsored by U.S. Army Cold Regions Research and Engineering Laboratory. These tracks were flown as a part of flights 1 and 2.

The Special Sensor Microwave Imager (SSM/I) track lines flown are shown in Figures 1 through 4. A complete set of systems logs and navigation logs for all tracks flown is provided as Appendix A. Appendix B is a comparison of the LTN-72 navigation system and the OMEGA (LTN-211) navigation

system used on the UP-3A. The LTN-72 was the primary navigation system. Appendix C is a copy of the NAVPOLAROCEANCEN Ice Observer report for flight 2, compiled by the onboard ice observer, AG2 D. Olsen. Appendix D shows representative KRMS images. Appendix E is the Naval Research Laboratory aircrew listing.

SYSTEM OPERATION

The KRMS operated flawlessly throughout the deployment, and over 6000 nautical miles of sea ice imagery were collected. Quality of the data is very good to excellent. The majority of imagery was collected from an altitude of 20,000 ft (6050 m), although several low altitude segments were flown at 5000 ft (1524 m) over ice, water, and land.

The entire data set is available for viewing at low radiometric resolution (4 bits per pixel, 16 gray levels) on VHS video tapes. The raw, unprocessed signal is recorded in real time and stored in full resolution on 16-track tape in analog form. Computer-compatible tapes, which show images at high resolution (11 bits per pixel), are also available. Approximately 20 hours of KRMS data have been converted to this high resolution digital format; ultimately the entire data set will be converted to this form.

System performance was good throughout the deployment. There were no hardware failures and no data were lost due to system malfunctions. The system was sensitive throughout its entire dynamic range, resulting in full radiometric contrast from virtually all terrain imaged.

NAVIGATION

The primary navigation system for these flights was the LTN-72 inertial navigation system. The OMEGA (Litton 211) was used as a backup. The

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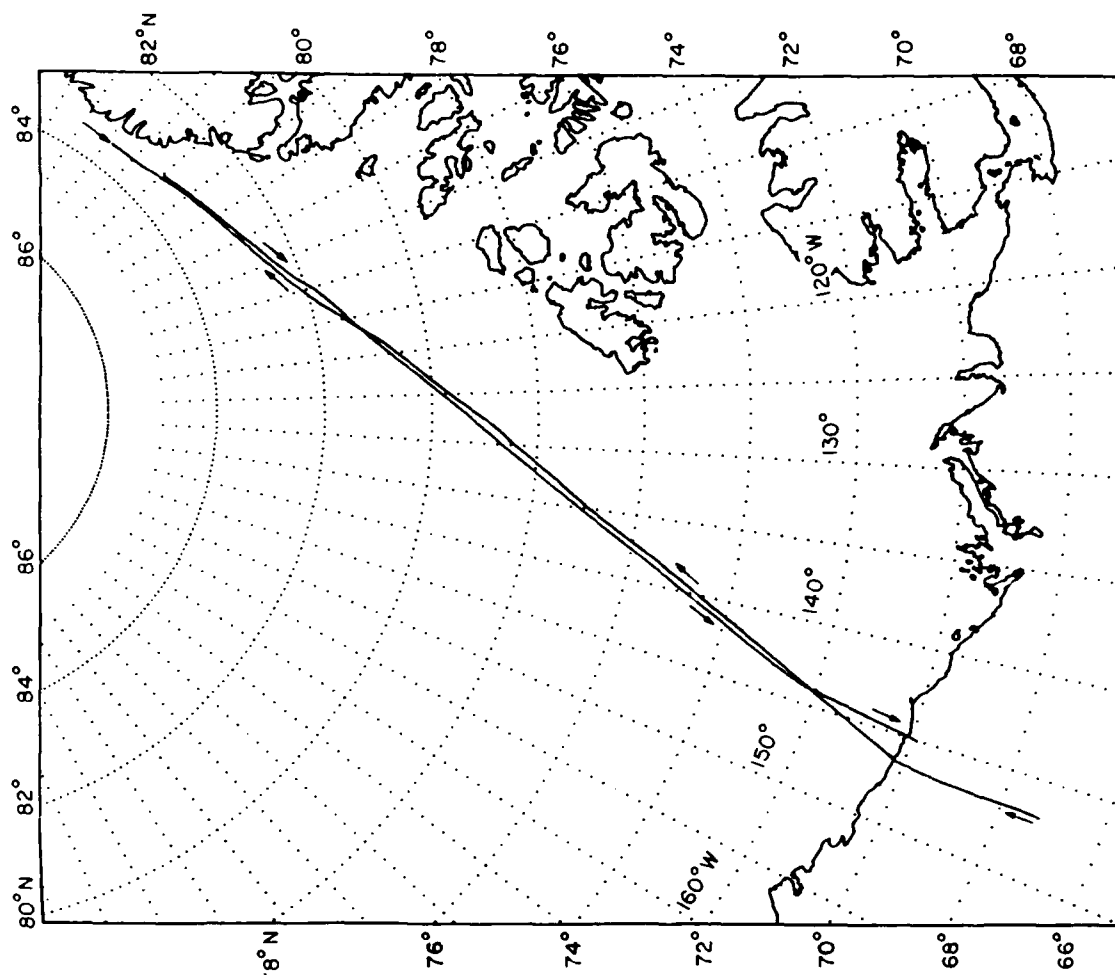


Figure 2. SSM/I KRMS track 2, 11 March 1988.

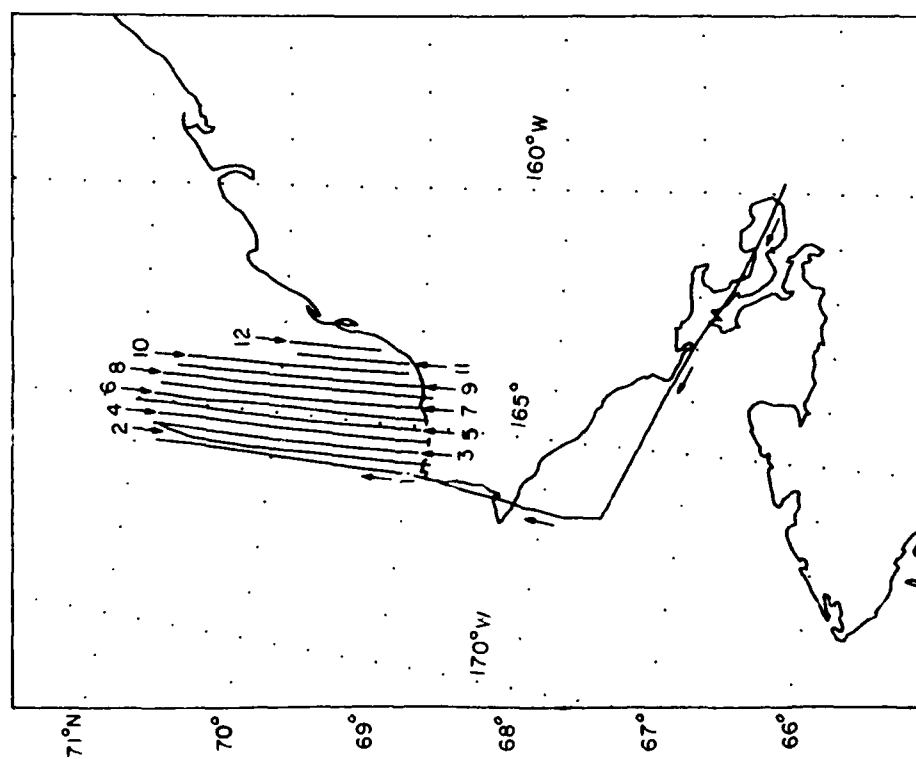


Figure 1. SSM/I KRMS track 1, 8 March 1988.

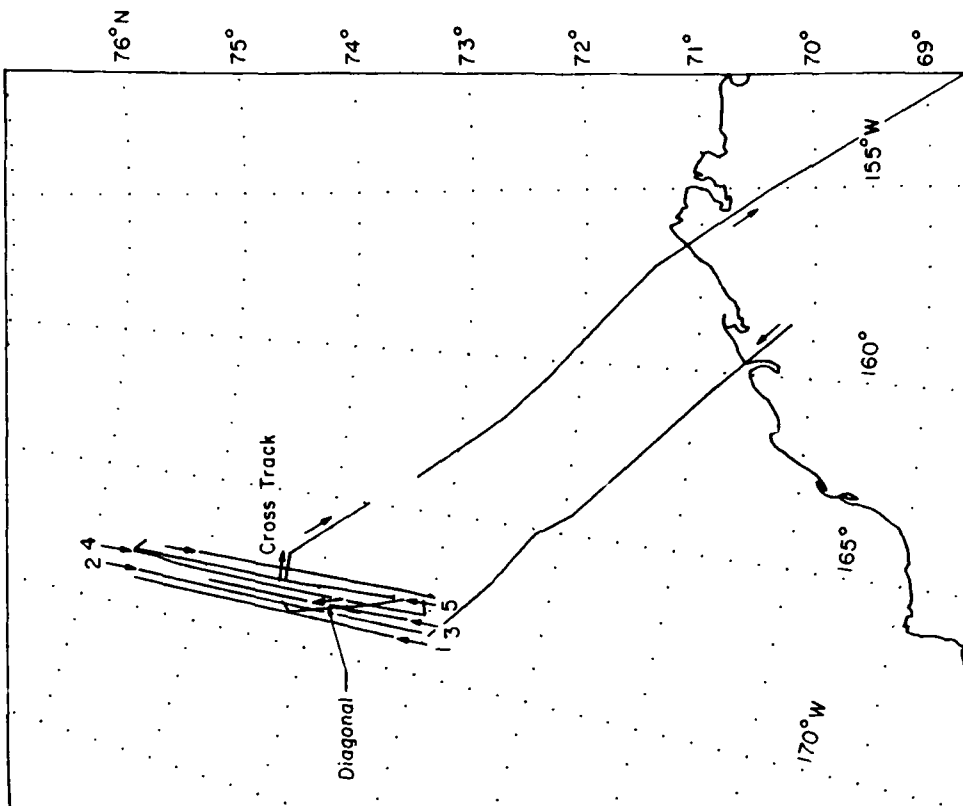


Figure 4. SSM/IU KRMS track 4, 14 March 1988.

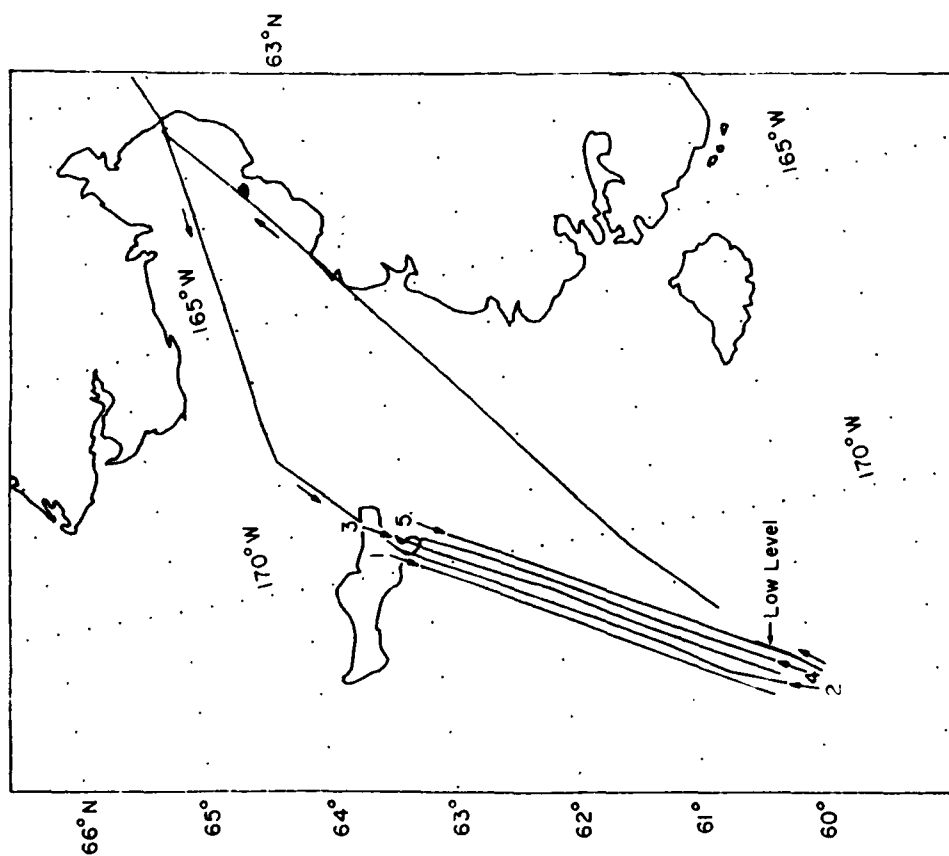


Figure 3. SSM/I KRMS track 3, 13 March 1988.

differences in geographic position provided by these systems were large at times. The OMEGA system was the more accurate of the two when it was on line. However, the poor reliability of the OMEGA prevented its use during most flights. One notable exception is flight 1 on 8 March, where the OMEGA provided a more accurate representation of the true flight track. The NASA DC-8 remote sensing aircraft was equipped with a global positioning system or GPS.

DISCUSSION

The NRL UP-3A used for this mission will be modified to allow installation of the KRMS pod as a wing station store for future missions.

KRMS imagery content and technical aspects of future system upgrades, etc., will be the topics of forthcoming reports and papers. This data report will be referenced as required to ensure continuity and clarity.

ACKNOWLEDGMENTS

Work reported here was supported by DA Project 4A161101A91D, *In-House Laboratory Independent Research*, administered by the U.S. Army Cold Regions Research and Engineering Laboratory, and by NASA's Oceanic Processes Branch through the NASA SSM/I Validation Program. We gratefully acknowledge the support of these sponsors.

APPENDIX A: COMPLETE SYSTEM LOGS FOR ALL TRACKS FLOWN

NAVIGATION LOG

Latitude and longitude are in degrees and minutes, to the nearest tenth of a minute.
LTN-72 inertial navigation system.

DAY 069
DATE 3-8-1988

SSM/I VALIDATION
FLIGHT #1
FAIRBANKS, ALASKA

GMT	LATITUDE	LONGITUDE	ALTITUDE	TRACK	GROUND SPEED	HEADING	DRIFT ANGLE	OUTSIDE AIR TEMPERATURE	
01:04:00	64 43.1	148 27.5	5,500		237				5,000'AGL
01:05:00	64 40.0	148 31.7	5,500		230				turning
01:06:00	64 38.8	148 22.0	5,500		230				turning
01:07:30	64 41.2	148 11.3	5,500		232				Fairbanks,AK.
01:08:00	64 42.3	148 07.0	5,500		230				
01:09:00	64 44.5	147 59.1	5,500		230				
01:10:00	64 46.4	147 52.8	5,500		235				end track
01:17:50	64 50.0	147 45.0	5,500		230				
01:18:40	64 47.5	147 40.5	5,500		243				start track
01:19:48	64 44.8	147 32.6	5,500		243				may be fast
01:21:05	64 41.5	147 23.3	5,500		253				
01:22:16	64 37.9	147 15.7	5,500		250				45 milli-sec scan
01:23:16	64 33.9	147 07.0	5,500		248	137	17.0		
01:25:00	64 30.2	146 57.4	5,500						end track
01:28:35	64 19.6	146 44.5	5,500		240				
01:30:30	64 17.8	146 29.2	5,500		247	000.6			start track
01:31:30	64 16.6	146 20.1	5,500		247	000.4	01.5		on track
01:32:00	64 15.8	146 13.9	5,500		247	000.4	1.9		
01:34:00	64 13.3	146 56.4	5,500		247	004	1.1		
01:35:00	64 11.8	146 46.1	5,500		240	000			end track

DAY 069
DATE 3-8-1988

SSM/I VALIDATION
FLIGHT #1
KOTZEBUE SOUND, ALASKA

[illegible]

Latitude and Longitude are in degrees and minutes, to the nearest tenth of a minute.
LTN-72 inertial navigation system.

DAY 069
DATE 3-8-1989

SSM/I VALIDATION
FLIGHT #1

LTN-72

KOTZEBUE SOUND-CAPE LISBURNE

GMT	LATITUDE	LONGITUDE	ALTITUDE	TRACK	GROUND SPEED	HEADING	DRIFT ANGLE	OUTSIDE AIR TEMPERATURE
03:25:13	67 50.0	166 30.5	20,000	009.9	331	000	0.1	Cape Lisburne
	68 03.4	166 24.9	20,000	009.5	330		.2	
03:29:00	68 08.0	166 24.9	20,000	008.3	329	007.9	.3	
03:31:00	68 16.3	166 19.6	20,000	009.1	328	008.8		
03:32:00	68 25.5	166 16.2	20,000	009.2	327	009	.4	overland
03:34:00	68 34.0	166 12.8	20,000	008.7	326	008.2	.3	
03:35:15	68 41.6	166 09.4	20,000	008.7	327	007.9	.7	overland
03:37:15	68 50.6	166 05.3	20,000	009.2	326	008.2	1.0	
03:38:00	68 56.9	166 02.1	20,000	009.8	326			end track
03:39:00	69 03.0	166 00.0	20,000	359	325	358	1.3	mosaic line 1
03:41:00	69 12.4	166 00.4	20,000	000	324	359	1.5	leads
03:42:15	69 19.0	166 00.0	20,000	001	323	359	1.4	
03:43:15	69 24.8	165 59.8	20,000	001.6	322	359.8	1.8	first-year ice
03:44:30	69 32.2	165 59.1	20,000	001	321	359.2	1.4	"
03:45:30	69 37.8	165 58.9	20,000	001.3	320	359.4	2.1	"
03:50:00	69 59.6	165 57.1	20,000					multi-year floes
03:53:30	70 18.9	165 55.2	20,000	000	319	356.8	3.0	"
03:54:45	70 25.7	165 55.0	20,000	001.4	317	357.8	3.3	5 mins to end of line 1
03:56:30	70 35.1	165 54.4	20,000	359.6	313	355.8	3.8	
03:58:00	70 44.2	165 54.2	20,000	000.1	313	356.3	4.0	
03:59:00	70:50:00	165 54.2						end line 1
04:03:30	70 49.1	165 33.4	20,000	198.6	272	199.9	L 1.3	begin mosaic line 2
04:04:30	70 45.4	165 37.8	20,000	199.4	274	201	1.5	multi-year floes
04:06:00	turning to correct track data bad							
04:06:30	70 34.8	165 46.0	20,000	180.5	277	182.9	2.2	
04:08:00	70 30.4	165 46.2	20,000	181.7	277	184	2.3	
04:10:30	70 17.2	165 48.0	20,000	183.3	276	185.7	2.2	

DAY 069
DATE 3-8-1988

SSM/I VALIDATION
FLIGHT #1
CAPE LISBURNE AREA

LTN-72

GMT	LATITUDE	LONGITUDE	ALTITUDE	TRACK	GROUND SPEED	HEADING	DRIFT ANGLE	OUTSIDE AIR TEMPERATURE
04:12:18	70 10.6	165 49.3	20,000	177.8	277	180.3	L 2.3	slight turn
04:13:30	70 02.7	165 48.8	20,000	178.2	277	180.5	2.3	
04:17:00	69 46.9	165 47.7	20,000	179.3	282	181.1	1.7	line 2
04:18:30	69 39.6	165 47.5	20,000	179.4	283	180.8	1.6	
04:20:30	69 31.4	165 47.3	20,000	179.5	283	181	1.5	
04:25:30	69 07.0	165 46.8	20,000	179.5	279	181.1	1.7	
04:27:00	69 00.0	165 47.0	20,000	179.4	278	181.1	1.7	end line 2
04:29:00	68 51.0	165 46.3						land crossing
04:32:30	68 56.9	165 32.7	20,000		328			
04:32:50	69 01.0	165 33.0	20,000	358.5	332	354	R 4.3	start line 3
04:34:00	69 05.5	165 33.4	20,000	357.3	332	352.8	4.5	
04:35:30	69 14.8	165 33.1	20,000	359.9	336	355.5	4.0	
04:37:00	69 22.2	165 34.4	20,000	001.1	338	357.7	3.6	
04:40:00	69 40.7	165 34.2	20,000	358.7	338	354.8	4.0	
04:44:00	70 02.4	165 35.7	20,000	359.3	337	355.4	3.7	
04:48:00	70 24.7	165 34.2	20,000	002.8	338	359.5	3.1	
04:48:30	70 29.1	165 33.6	20,000	001.8	337	358.3	3.4	
04:51:00	70 42.4	165 32.1	20,000	001.8	337	358.6	3.4	
04:52:30	70 48.0	165 31.6						
04:53:00	70 52.2	165 31.0						end line 3
04:55:30	70 50.6	165 17.3	20,000	176.8	277	178.4	L 1.4	start line 4
04:56:00	70 47.5	165 16.8	20,000	178.1	278	179.2	1.6	
04:59:00	70 34.7	165 16.9	20,000	182.7	284	182.8		
05:02:00	70 20.3	165 19.1	20,000	179.9	288	179.3	0.6	
05:05:00	70 05.3	165 19.8	20,000	179.6	291	178.2	1.5	
05:08:15	69 50.5	165 19.6	20,000	179.9	292	178.6	1.3	

DAY 069
DATE 3-8-1988

SSM/I VALIDATION
FLIGHT #1

LTN-72

GMT	LATITUDE	LONGITUDE	ALTITUDE	TRACK	GROUND SPEED	HEADING	DRIFT ANGLE	OUTSIDE AIR TEMPERATURE
05:10:00	69 42.4	165 19.6	20,000	179.9	293	178.6	L 1.3	
05:14:40	69 19.0	165 19.5	20,000	179.7	294	178.2	1.4	
05:17:00	69 08.5	165 19.3	20,000	179.8	294	178	1.9	
05:18:30	69 00.2	165 19.3	20,000	179.8	293	177.9	1.8	
05:20:00	68 53.0	165 18.2	20,000	179.6	293	177.9	1.5	end line 4
05:23:30	68 57.2	165 04.4	20,000	360.0	329	360.0	R 0.1	start line 5
05:24:30	69 03.0	165 04.3	20,000	000.2	333	359.8	0.4	
05:26:30	69 13.4	165 04.5	20,000	359.1	335	358.1	0.9	lead
05:28:30	69 25.6	165 05.2	20,000	358.5	332	356.5	1.9	
05:31:30	69 43.6	165 06.8	20,000	357.6	331	354.9	2.5	
05:35:00	70 02.5	165 07.0	20,000	002.6	334	360	2.5	
05:37:30	70 15.0	165 05.4	20,000	002.9	335	360	2.8	transition to multi-year
05:40:30	70 33.0	165 03.7	20,000	000.5	338	356.8	3.6	and thick first-year ice
05:43:30	70 48.8	165 01.0	20,000	000.6	340	356	4.8	multi-year ice zone begins
05:45:45	71 01.0	165 01.8	20,000					end line 5
06:06:30	70 53.0	164 50.2	20,000	182.0	271	185.9	L 3.6	start line 6
06:08:00	70 47.2	164 50.9	20,000	183.7	272	186.6	2.8	
06:10:15	70 35.5	164 53.6	20,000	178.6	276	181.4	2.3	
06:14:00	70 18.3	164 51.6	20,000	176.8	276	178.5	1.5	
06:16:30	70 06.4	164 50.1	20,000	180.7	283	180.9	.4	
06:19:15	69 53.3	164 50.8	20,000	181.1	286	181.1		
06:22:45	69 36.8	164 52.4	20,000	182.3	286	180.6	1.8	
06:26:30	69 18.3	164 52.7	20,000	179.1	285	176.8	2.2	
06:29:00	69 07.5	164 52.2	20,000	179.3	287	176.6	2.7	
06:31:45	68 54.5	164 51.9	20,000	179.7	288	176.8		end line 6

DAY 069
DATE 3-8-1988

SSM/I VALIDATION
FLIGHT #1

GMT	LATITUDE	LONGITUDE	ALTITUDE	TRACK	GROUND SPEED	HEADING	DRIFT ANGLE	OUTSIDE AIR TEMPERATURE
06:35:35	68 59.3	164 36.9	20,000	359	339	000	L 0.9	start line 7 overland
06:38:10	69 11.4	164 37.5	20,000	000.3	341	001.2	0.9	
06:42:00	69 32.4	164 38.3	20,000	357.6	342	357	.8	
06:44:00	69 47.5	164 39.3	20,000	001.0	341	001.3	.5	large multi-year floe
06:49:30	70 16.0	164 38.3	20,000	001.6	338	001.3	.4	
06:53:45	70 40.1	164 36.6	20,000	002.6	338	001.2	1.7	
06:55:45	70 51.0	164 35.1	20,000					end line 7
06:58:30	70 50.6	164 21.8	20,000	178	276	177.2	L 2.4	start line 8
07:01:30	70 40.1	164 21.3	20,000	182	281	184.4	2.1	
07:03:15	70 30.9	164 22.6	20,000	183.7	282	186.3	2.5	
07:06:45	70 14.4	164 24.8	20,000	180.4	285	181.8	3.0	
07:10:00	69 59.0	164 24.6	20,000	178	286	181.8	3.8	
07:12:45	69 45.7	164 23.2	20,000	177.6	284			large multi-year floe
07:17:45	69 22.7	164 22.6	20,000	180.1	283	184.4	4.3	
07:22:45	68 58.9	164 23.1	20,000	180.7	282	184.6	3.7	end line 8
07:24:00	68 53.4	164 23.3	20,000					landfall line 8
07:27:00	68 59.5	164 09.7	20,000	000	336	354.3	R 5.6	start line 9
07:29:30	69 12.3	164 09.9	20,000	358.6	340	353	5.5	
07:32:45	69 30.8	164 10.2	20,000	000.2	344	354.9	5.1	
07:36:00	69 49.2	164 10.3	20,000	359.9	345	355.4	4.4	large multi-year floe
07:41:30	70 20.4	164 09.9	20,000	001.6	347	359	2.7	
07:45:45	70 44.5	164 09.1	20,000	359.5	348	357.1	2.4	End line 9
07:52:00	70 40.5	163 55.0	20,000	180.0	278	179	R 1.2	start line 9a(off track)
07:53:30	70 34.5	163 54.3	20,000	181.7	266	180	1.6	
07:56:30	70 22.6	163 55.2	20,000	182.5	269	180.8	1.8	
07:59:10	70 09.0	163 56.4	20,000	180	271	178.2	2.0	
08:03:45	69 47.9	163 56.4	20,000	179.1	273	176.7	2.4	
08:07:40	69 31.3	163 55.6	20,000	179.1	274	176.3	2.8	H.F transmission
08:13:00	69 05.3	163 54.7	20,000	179.2	276	176.3	2.9	End line 10

SSM/I VALIDATION
FLIGHT #1[illegible]

DAY 069
DATE 3-8-1988

KRMS SYSTEM LOG

SSM/I VALIDATION
FLIGHT #1

CHUKCHI SEA MOSAIC, CAPE LISBURNE

GMT TIME	B1	B0	REF LOAD	GAIN	OFFSET	V/H	SCAN RATE MS	ALT	G.S.	COMMENTS
01:08:05	+9.5	0	-5.7Volts	1.22	4.64	46	46.4	5,000	232	Tape Started 200' before beginning of track
01:12:24	+9.5	0	-5.7	1.22	4.64	46	46.4	5,000	238	End of Track
01:18:40	+9.5	0	-5.7	1.10	4.72	45.8	45.28	5,000	230	start track 2 9% off aspect
01:26:50	+9.5	0	-5.7	1.10	4.72	45.0	45.0	5,000	248	end of track 2
01:28:53	+9.5	0	-5.7	1.10	4.72	48.0	43.2	5,000	247	start track 3
01:35:42	+9.5	0	-5.7	1.10	4.72	48.0	43.0	5,000	247	end of track 3
02:50:00	+9.5	0	-3.0	1.30	4.64	14.8	139	20,000	297	start track, kotzebue
02:52:00	+9.5	0	-3.0	1.30	4.64	15.5	133	20,000	310	adjust for V/H
03:02:00	+9.5	0	-2.5	1.30	4.64	15.5	133	20,000	313	Ref Load Temp change
03:22:40	+9.5	0	-2.5	1.30	4.64	15.5	133	20,000	317	end track, Kotezebue sound
03:25:55	+9.5	0	-2.5	1.30	4.64	16.5	125	20,000	331	start track 2,Cape Lisburne
03:39:00	+9.5	0	-2.5	1.30	4.64	16.3	127	20,000	326	Mosaic line 1
03:59:45	+9.5	0	-2.0	1.30	4.64	16.0	127	20,000	320	end of line 1
04:04:04	+7.5	0	-2.0	1.30	4.64	13.6	152	20,000	273	start mosaic line 2

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SSM/I VALIDATION
FLIGHT #1
CHUKCHI SEA MOSAIC, CAPE LISBURNE

GMT TIME	B1	B0	REF LOAD	GAIN	OFFSET	V/H	SCAN RATE MS	ALT	G.S.	COMMENTS
04:29:22	9.5	0	-2.0	1.30	4.64		149	20,000	277	end mosaic line 2
04:32:30	9.5	0	-2.0	1.3	4.64	16.3	127	20,000	332	start mosaic line 3
04:53:00	9.5	0	-1.8	1.3	4.64	16.8	127	20,000	338	end mosaic line 3
04:56:00	9.5	0	-1.8	1.3	4.64	13.7	150	20,000	277	start mosaic line 4
05:20:40	9.5	0	-1.8	1.30	4.64	14.6	150	20,000	293	end mosaic line 4
05:23:25	9.5	0	-1.7	1.30	4.64	16.4	126	20,000	329	start mosaic line 5
05:46:20	9.5	0	-1.7	1.30	4.64	16.4	126	20,000	330	end mosaic line 5
06:00:00	9.5	0	-1.7	1.30	4.64	14.6	143	20,000	290	multi-year ice turns pulled data tape
06:06:40	9.5	0	-1.7	1.30	4.64	13.5	152	20,000	269	start mosaic line 6
06:32:10	9.5	0	-1.5	1.30	4.64	14.3	145	20,000	286	end mosaic line 6
06:36:00	9.5	0	-1.5	1.30	4.64	16.8	123	20,000	337	start mosaic line 7
06:56:00	9.5	0	-1.5	1.30	4.64	16.8	123	20,000	341	end mosaic line 7
06:58:45	9.5	0	-1.5	1.30	4.64	13.8	150	20,000	276	start mosaic line 8
07:24:25	9.3	0	-1.5	1.30	4.64	13.8	150	20,000	277	end mosaic line 8

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SSM/I VALIDATION
FLIGHT #1
CHUKCHI SEA MOSAIC, CAPE LISBURNE

GMT TIME	B1	B0	REF LOAD	GAIN	OFFSET	V/H	SCAN RATE MS	ALT	G.S.	COMMENTS
07:27:00	9.5	0	-1.5	1.30	4.64	16.8	123	20,000	336	start mosaic line 9
07:47:03	9.5	0	-1.5	1.30	4.64	17.0	123	20,000	340	end mosaic line 9
07:52:00	9.5	0	-1.5	1.30	4.64	13.9	150	20,000	278	start mosaic line 10
08:14:00	9.5	0	-1.5	1.30	4.64	13.9	150	20,000	278	end mosaic line 10
08:15:50	9.5	0	-1.5	1.30	4.64	17.0	121	20,000	340	start mosaic line 11
08:25:10	9.5	0	-1.5	1.30	4.64	17.0	121	20,000	340	end mosaic line 11
08:27:15	9.5	0	-1.5	1.30	4.64	13.7	150	20,000	275	start mosaic line 12
08:36:35	9.5	0	-1.5	1.3	4.64	13.7	150	20,000	275	end mosaic line 12

Lines 11 & 12 are short lines.
Turns during data lines will cause problems.

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SSM/I VALIDATION
FLIGHT #2
OUTBOUND TRACK

GMT	LATITUDE	LONGITUDE	ALTITUDE	TRACK	GROUND SPEED	HEADING	DRIFT ANGLE	OUTSIDE AIR TEMPERATURE
16:03:30	67 14.4	146 48.7	20,000 ft	004.2	333	001.1	R 2.9	start outbound track
16:05:30	67 26.0	146 46.5	20,000	005.2	321	001.6	3.5	
16:03:30	67 42.0	146 45.1	20,000	001.1	315	357.7	3.3	
16:11:30	67 56.7	146 44.8	20,000	000.8	312	357.6	3.0	
16:13:30	68 06.9	146 44.8	20,000	000.5	313	357.8	1.7	
16:16:15	68 22.1	146 45.5	20,000	357.8	309	357.4	0.9	
16:18:30	68 35.0	146 46.4	20,000	001.2	308	000.1	2.7	
16:25:30	69 10.3	146 43.1	20,000	002.2	330	001.1	1.0	
16:29:00	69 29.1	146 41.9	20,000	001.3	327	359.9	1.0	
16:32:30	69 48.5	146 40.2	20,000	000.1	326	358.8	1.0	
	70 06.9	146 28.8	20,000	019.0	331	018.2	0.7	
16:37:30	70 14.4	146 20.9	20,000	020.0	331	018.8	1.3	
16:38:30	70 20.9	146 14.3	20,000	020.8	332	019.0	1.7	
16:41:00	70 32.7	146 00.6	20,000	019.8	333	018.0	2.1	
	70 53.2	145 54.0	20,000	022.5	334	019.6	2.8	
16:48:30	71 11.4	145 12.3	20,000	020.0	336	017.0	3.1	
16:55:15	71 46.8	144 28.0	20,000	023.0	343	019.4	3.7	
17:00:30	72 13.2	143 51.0	20,000	024.3	338	020.1	4.2	
17:05:00	72 39.2	143 10.3	20,000	025.6	343	021.2	4.5	
17:09:00	72 57.3	142 39.3	20,000	023.8	337	019.6	4.0	
17:14:15	73 24.3	141 58.2	20,000	023.1	341	020.6	2.3	
17:19:30	73 51.4	141 17.0	20,000	023.9	350	022.3	1.4	
17:20:30	73 57.0	141 08.3	20,000	023.0	352	021.5	1.3	
17:21:30	74 04.0	140 57.5	20,000	022.7	356	022.2	0.6	
17:22:30	74 14.5	140 40.3	20,000	026.2	361	025.8	0.5	
17:25:30	74 23.8	140 24.0	20,000	025.4	363	025.0	0.6	
17:27:00	74 31.4	140 09.4	20,000	026.6	364	026.1	0.5	
17:31:45	74 58.3	139 13.0	20,000	028.8	366	029.5	L 0.8	

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SSM/I VALIDATION
FLIGHT #2
OUTBOUND TRACK

GMT	LATITUDE	LONGITUDE	ALTITUDE	TRACK	GROUND SPEED	HEADING	DRIFT ANGLE	OUTSIDE AIR TEMPERATURE
17:33:30	75 07.4	138 54.5	20,000ft	027.5	367	028.2	L 0.8	
17:36:30	75 22.3	138 25.5		026.9	369	028.2	1.4	
17:40:30	75 46.2	137 36.6		026.6	368	030.2	3.8	
17:44:00	76 04.8	136 58.3		028.0	374	033.8	5.6	
17:47:00	76 20.8	136 23.3		028.9	376	034.5	5.6	
17:50:43	76 42.0	135 30.7	22,000ft					
17:55:00	77 04.4	134 30.1		033.2	372	041.8	9.0	
17:58:00	77 16.7	133 53.6		035.2	344	044.3	8.6	
17:59:30	77 24.3	133 27.8		037.2	363	044.8	7.8	
18:00:00	77 29.7	133 10.0		038.3	373	046.1	8.0	
18:02:00	77 36.8	132 44.0		034.3	386	041.4	6.9	
18:07:00	78 04.2	131 18.5		032.8	371	039.2	6.3	
18:13:00	78 31.7	129 36.1	24,000 ft	043.3	335	048.9	5.8	
18:15:00	78 39.4	129 00.0		044.3	347	049.0	4.7	
18:16:15	78 44.7	128 35.2		039.1	356	042.7	3.7	
18:18:00	78 52.9	128 31.3		035.6	364	038.1	2.5	
18:19:30	79 00.2	127 33.7		035.1	369	035.7	1.9	
18:23:45	79 21.8	126 13.7		035.7	375	037.4	1.2	
18:25:30	79 30.6	125 38.4		039.8	374	043.7	1.4	
18:30:00	79 51.4	123 51.6		044.7	357	045.0		
18:37:45	80 24.4	120 53.2	20,000 ft	045.3	343	045.9	0.4	
18:39:30	80 31.4	120 10.9		043.7	342	045.0	2.0	
18:41:30	80 39.8	119 23.8		042.0	342	044.0	2.3	
18:43:48	80 49.3	118 30.8		041.1	343	042.8	1.7	
18:45:30	80 57.0	117 48.5		041.1	342	042.5	1.5	
18:47:30	81 03.3	117 13.6		040.8	342	042.1	1.2	
18:49:30	81 14.1	116 13.9		044.0	341	045.9	1.3	

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SSM/I VALIDATION
FLIGHT #2
OUTBOUND TRACK

GMT	LATITUDE	LONGITUDE	ALTITUDE	TRACK	GROUND SPEED	HEADING	DRIFT ANGLE	OUTSIDE AIR TEMPERATURE
18:52:00	81 24.3	115 09.2	20,000 ft	043.7	340	044.2	L 0.6	
18:55:00	81 36.6	113 50.8		043.1	339	043.3	0.2	
18:58:00	81 48.7	112 29.2		053.2	336	052.9		
19:02:00	82 02.5	110 20.7		052.4	336	051.7	0.6	
19:04:00	82 09.1	109 19.7		052.0	337	051.3	0.7	
19:06:00	82 15.5	108 12.2		056.9	338	056.5	0.6	
19:08:00	82 21.7	107 01.7		056.8	340	055.8	R 1.0	
19:10:00	82 27.4	105 47.4		060.0	346	058.9	1.1	
19:12:00	82 32.4	104 30.3		064.7	339	063.7	1.0	
19:14:00	82 37.4	103 08.6		064.6	340	063.3	1.2	
19:16:00	82 42.0	101 51.6		064.7	339	063.0	1.7	
19:18:00	82 46.2	100 29.4		068.0	338	066.8	1.1	
19:20:00	82 50.0	099 05.2		072.5	338	071.2	1.3	
19:22:00	82 52.6	097 59.6		072.3	337	070.6	1.8	
19:24:00	82 56.7	096 12.2		072.9	338	070.6	2.4	
19:27:00	83 01.6	093 58.4		073.6	333	070.4	3.1	
19:30:00	83 06.7	091 35.2		073.1	330	070.3	2.8	
19:33:17	83 11.5	089 27.4		071.9	330	068.6	3.4	
19:36:00	83 16.0	087 26.3		076.5	330	072.8	3.5	
19:40:00	83 21.6	084 24.4		075.1	330	071.2	3.9	
19:43:00	83 26.3	082 02.7		076.6	323	067.4	5.3	
19:44:00				080.0	325	077.6	5.3	
19:46:00	83 28.6	079 48.5		083.8	327	078.3	5.6	
19:50:00	83 29.1	076 40.2		089.3	311	082.4	6.9	
19:51:00	83 29.1	075 55.5		089.9	304	083.4	6.9	

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SSM/I VALIDATION
FLIGHT #2
INBOUND TRACK

GMT	LATITUDE	LONGITUDE	ALTITUDE	TRACK	GROUND SPEED	HEADING	DRIFT ANGLE	OUTSIDE AIR TEMPERATURE
20:06:00	83 17.2	085 19.9	20,000ft	258.4	302	260.2	12.1	Start inbound track
20:09:00	83 13.7	087 11.5		252.9	292	255.2	2.5	
20:13:00	83 08.5	089 40.7		256	284	259	.4	
20:16:00	83 05.2	091 34.7		254.2	282	256.2	12.3	
20:18:00	83 02.5	092 48.7		253.3	281	254.9	1.9	
20:20:00	83 00.0	094 01.9		252.4	281	253.2	1.0	
20:23:00	82 57.0	095 14.9		248.8	283	249.6	1.0	
20:28:00	82 46.4	098 47.7	20,000 ft	251.5	285	251.9	.5	
20:30:00	82 42.7	099 58.4		250.6	287	250.8	L .2	
20:33:00	82 36.8	101 40.8		247.3	289	246.7	R .2	Time sync with DC-8
20:40:00	82 21.4	105 31.1		240	292	236.9	.4	
20:43:00	82 13.3	107 07.7		236.9	292	236.2	.6	
20:46:00	82 05.1	108 28.0		231.3	292	230.9	1.2	
20:48:00	81 58.8	109 20.3		229.3	289	228.1	1.1	
20:50:00	81 52.2	110 08.0		225.4	284	224.2	1.0	
20:53:00	81 44.0	111 28.6		238.7	285	236.4	2.1	DC-8 contrail observed
20:56:00	81 36.2	112 49.2		236.6	282	234.0	2.3	passed left to right
21:00:00	81 25.3	114 30.5		233.8	278	231.1	2.3	
21:06:00	81 08.1	116 55.1		232.7	284	229	3.0	
21:08:00	81 02.3	117 43.2		231.6	286	278	3.3	
21:10:00	80 56.0	118 29.1		230.1	286	227.3	2.7	
21:12:00	80 49.6	119 12.8		226.9	285	223.7	2.6	course correction
21:15:00	80 39.7	120 20.5		226.0	287	223.0	2.8	
21:18:00	80 29.8	121 19.5		227.0	286	219.2	3.3	
21:20:00	80 22.8	121 57.6		221.0	286	217.6	3.2	
21:23:00	80 12.0	122 52.1		224.3	286	220.3	3.7	
21:31:00	79 44.7	125 18.2		221.7	280	216.3	5.9	

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SSM/I VALIDATION
FLIGHT #2
INBOUND TRACK

GMT	LATITUDE	LONGITUDE	ALTITUDE	TRACK	GROUND SPEED	HEADING	DRIFT ANGLE	OUTSIDE AIR TEMPERATURE
21:33:00	79 37.5	125 50.8	20,000 ft	218.5	277	212.7	L 5.6	
21:35:00	79 30.6	126 23.2		221.6	275	215	6.3	
21:37:00	79 23.4	126 54.8		218.4	272	212.2	5.8	
21:40:00	79 13.2	127 42.4		221.7	259	214	7.4	
21:42:00	79 06.9	128 10.3		219.5	256	212	6.9	
21:47:00	78 50.5	129 18.3		214.7	250	208.3	R 6.0	
21:52:00	78 33.1	130 27.8		216.5	273	209.4	6.5	Sextant sight
21:54:00	78 25.8	130 53.9		215.0	270	208.2	6.7	
21:56:00	78 18.7	131 18.4		218.8	256	211.9	7.9	
21:58:00	78 12.1	131 45.0		220.5	257	212.3	7.8	
22:00:00	78 05.6	132 10.0		218.4	249	210.8	7.3	
22:03:00	77 55.5	132 42.0		215.7	244	209.1	6.3	
22:13:00	77 20.0	134 19.8		212.7	253	208.5	4.2	turns
22:15:00	77 13.0	134 39.8		212	256	207.8	4.0	
22:17:00	77 04.0	135 01.6		212.5	256	208.7	3.9	
22:19:00	76 58.5	135 19.9		212.2	258	208.3	3.8	
22:22:00	76 46.3	135 52.3		210.8	258	208.1	2.7	
22:25:00	76 36.2	136 17.5		209.6	263	207.3	2.4	
22:28:00	76 24.3	136 45.0		208	276	206.9	1.2	
22:30:00	76 16.0	137 03.2		207.2	279	206.1	1.0	
22:33:00	76 03.8	137 31.5		206.4	282	207.3	1.1	
22:35:00	75 55.5	137 49.5		207.6	282	206.8	.5	
22:38:00	75 43.1	138 15.6		207	278	206.8	.2	
22:40:00	75 34.3	138 32.9		206.1	277	206.1		
22:43:00	75 22.5	138 56.2		209	277	208.9	.1	
22:45:00	75 14.4	139 13.7		208.8	278	208.8		

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SSM/I VALIDATION
FLIGHT #2
INBOUND TRACK

GMT	LATITUDE	LONGITUDE	ALTITUDE	TRACK	GROUND SPEED	HEADING	DRIFT ANGLE	OUTSIDE AIR TEMPERATURE
22:48:00	75 01.9	139 39.8	20,000 ft	208.1	280	208.1		
22:50:00	74 53.8	139 56.1		207.6	282	207.5	.1	
22:59:00	74 15.2	141 04.0		207.6	279	203.8	L 1.0	
23:01:00	74 07.2	141 16.1		201.5	277	202.9	1.4	
23:03:00	73 57.4	141 30.2		200.7	277	204	1.5	
23:05:00	73 50.1	141 42.3		205	277	206.2	1.3	
23:08:00	73 37.7	142 02.9		204.9	280	205.9	.9	
23:10:00	73 29.2	142 16.8		204.8	283	205.6	.8	
23:13:00	73 16.2	142 37.2	20,000 ft	204.2	287	204.8	.6	
23:15:00	73 03.0	142 57.3		203.5	293	204.2	L .7	
23:18:00	72 53.3	143 11.3		202.7	295	203	.2	
23:20:00	72 44.9	143 23.1		202.9	296	202	.8	
23:23:00	72 21.2	143 42.2		202.1	297	201.2	1.1	
23:27:00	72 11.9	143 59.1		189.9	301	190.2	.5	
23:30:00	71 57.2	144 06.7		188.7	303	189.9	L 1.3	
23:33:00	71 42.2	144 12.7		186.9	304	189	2.3	
23:35:00	71 31.7	144 16.5		188.9	306			turns
23:38:00	71 16.7	144 24.2		189	310	191	L 2.3	
23:40:00	71 06.3	144 29.5		189.4	319	191	1.8	
23:44:00	70 45.7	144 39.5		189.2	315	190.4	1.1	
23:47:00	70 30.1	144 46.9		188.6	316	190.0	1.5	
23:50:00	70 14.5	144 53.6		188.2	316	189.9	1.7	
23:51:00	70 09.3	144 55.8			313			
23:54:00	69 54.0	145 02.1						break track

SSM/I VALIDATION
FLIGHT #2
FAIRBANKS LOCAL AREA

[illegible]

SSM/I VALIDATION
FLIGHT #2
FAIRBANKS LOCAL AREA

[illegible]

KRMS SYSTEM LOG

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SSM/I VALIDATION
FLIGHT #2

GMT TIME	B1	B0	REF LOAD	GAIN	OFFSET	V/H	SCAN RATE MS	ALT	G.S.	COMMENTS
16:05:00	9.5V	0	-4.5volts	1.3	4.67	15.9	122	20,000ft	339knots	Brooks Range, start at 300ft.
16:07:00	9.5	0	-4.5	1.3	4.67		130	20,000	319	change scan speed, clouds.
16:30:35	9.5	0	-3.5	1.3	4.67	16.3	130	20,000	327	3% error in aspect ratio.
16:36:00	9.5	0	-3.5	1.3	4.67	16.5	125	20,000	331	start ice mapping, 1475 ft.
16:53:30	9.5	0	-3.5	1.3	4.67	17.1	125	20,000	343	3% error in aspect ratios
17:03:58	9.5	0	-3.0	1.3	4.67	17.1	125	20,000	343	ice camp, edge of multi-year ice.
17:11:30										Big crack, dark nilas no water.
17:18:00										first-year ice.
17:20:00	9.5	0	-3.0	1.3	4.67	17.5		20,000	350	5% off aspect ratio
17:21:00	9.5	0	-3.0	1.3	4.67	17.6	128	20,000	352	change scan speed
17:28:00	9.5	0	-3.0	1.3	4.67	17.6	118	20,000	360	interesting area First-year.
17:44:00	9.5	0	-3.0	1.3	4.67	18.6	111	20,000	372	changed scan rate
17:49:00	9.5	0	-3.0	1.3	4.67	18.6	111	20,000	272	solid cloud cover
17:50:40										climbing to 22,000ft aspects will be off

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SSM/I VALIDATION
FLIGHT #2

GMT TIME	B1	B0	REF LOAD	GAIN	OFFSET	V/H	SCAN RATE MS	ALT	G.S.	COMMENTS
17:58:00	9.5V	0	-3.0volts	1.3	4.67	14.9	138	22,000ft	328knots	
17:59:00	9.5	0	-3.0	1.3	4.67	15.6	132	22,000	344	change scan rate
18:00:18	9.5	0	-3.0	1.3	4.67	16.6	125	22,000	363	change scan rate
18:02:30	9.5	0	-3.0	1.3	4.67	17.5	118	22,000	386	change scan rate
18:10:00							154	23,000	323	climbing, aspects off
18:13:30	9.5	0	-3.0	1.3	4.67	13.6	151	24,000	328	change scan rate
18:14:00	9.5	0	-3.0	1.3	4.67	13.6	151	24,000	328	interesting area, poss open water.
18:30:00										descent to 20,000 ft
18:39:00	9.5	0	-3.0	1.3	4.67	17.3	119	20,000	347	change scan rate
19:03:45	9.5	0	-3.0	1.3	4.67	17.3	119	20,000	340	poss ice island fragment.
19:51:00	9.5	0	-3.0	1.3	4.67	17.3	119	20,000	331	end track at 8800ft on tape.
20:07:00	9.5	0	-2.5	1.3	4.67	15.1	137	20,000	302	start inbound track, new tape.
20:15:00	9.5	0	-2.5	1.3	4.67	14.1	147	20,000	282	change scan rate
20:50:30										course change

DAY 071
DATE 3-11-1988

SSM/I VALIDATION
FLIGHT #2

GMT TIME	B1	B0	REF LOAD	GAIN	OFFSET	V/H	SCAN RATE MS	ALT	G.S.	COMMENTS
21:36:00	9.5	0	-3.0	1.3	4.67	14.4	147	20,000 ft	288knots	few dropouts, cause unknown
21:45:50	9.5	0	-3.0 volts	1.3	4.67	12.5	147	20,000	250	entering area of first-year ice
21:50:00										possible open water
22:01:30	9.5	0	-3.5	1.3	4.67	12.2	170	20,000	244	change scan rate, head winds
22:25:15	9.5	0	-3.5	1.3	4.67	12.2	170	20,000	248	large flow, looks neat
22:28:00	9.5	0	-3.5	1.3	4.67	13.8	150	20,000	276	change scan rate
22:35:20	9.5	0	-3.5	1.3	4.67		150	20,000	282	open water, new ice
22:39:20	9.5	0	-3.5	1.3	4.67		150	20,000	280	nice large floe
23:16:00	9.5	0	-3.5	1.3	4.67		140	20,000	293	change scan rate
23:32:01	9.5	0	-3.5	1.3	4.67		140	20,000	302	very high Tb, new ice
23:39:00	9.5	0	-3.5	1.3	4.67	16	129	20,000	320	change scan rate
23:54:00	9.5	0	-3.5	1.3	4.67	16	129	20,000	320	end track

DAY 072
DATE 3-11-1988

SSM/I VALIDATION
FLIGHT #2
FAIRBANKS LOCAL

GMT TIME	B1	B0	REF LOAD	GAIN	OFFSET	V/H	SCAN RATE MS	ALT	G.S.	COMMENTS
00:53:00	9.5	0	-2.5volts	1.1	4.68	44	47	AGL 5,000ft	220 knots	Mark on top Fairbanks airport
01:03:18	9.5	0	-2.5	1.1	4.68	53.6	40	5,000	272	first track, 570 ft.
01:07:08							40	5,000	261	end track #1
01:12:26	9.5	0	-2.5	1.2	4.67	48	43	5,000	240	start track #2
01:23:23	9.5	0	-2.5	1.2	4.67	48	43	5,000	240	end track #2
01:25:45	9.5	0	-2.5	1.2	4.67	46.6	44	5,000	233	Start track #3
01:32:23	9.5	0	-2.5	1.2	4.67	46.6	44	5,000	233	end track #3 1681 ft.

DAY 073
DATE 3-13-1988

SSA. .ALIDATION
FLIGHT #3
BERING SEA

GMT	LATITUDE	LONGITUDE	ALTITUDE	TRACK	GROUND SPEED	HEADING	DRIFT ANGLE	OUTSIDE AIR TEMPERATURE
16:30:00	64 06.5	159 54.6	20,000 ft	258	304	253.1	R 5.2	Track 1, Norton Sound
16:33:00	64 03.5	160 28.1		259	299	253.3	5.8	overland
16:35:00	64 01.2	160 50.3		256.7	299	251.6	5.2	
16:37:00	64 01.0	161 13.1		277.8	309	272.1	5.8	open water
16:39:00	64 01.4	161 34.4		271.7	309	265.4	6.3	thin ice & first-year
16:41:00	64 01.7	161 00.0		271.6	309	264.9	6.6	first-year
16:43:00	64 02.1	162 23.6		272	311	264.8	7.3	young ice
16:45:00	64 02.5	162 47.4	20,000 ft	277.3	314	264.5	7.8	
16:47:00	64 02.7	163 11.3		270.2	315	262.7	7.8	young & new ice
16:49:00	64 02.9	163 35.4		270.5	316	262.8	7.9	
16:51:00	64 02.8	163 59.4		269	317	267.7	6.8	
16:53:00	64 02.7	164 23.5		269.3	318	262.4	6.6	
16:55:00	64 02.4	164 47.7		268.2	319	262.0	6.3	broken. leads
16:57:00	64 02.2	165 11.8		268.7	317	262	6.6	
16:59:00	64 01.9	165 35.8		268.6	315	261.8	6.7	
17:01:00	64 01.6	165 59.7			314	261.7	7.7	
17:03:00	64 01.3	166 23.9		268.3	315	260.9	7.2	floes larger
17:05:00	64 00.9	166 48.4		267.6	316	260.8	6.4	
17:09:00	63 58.3	167 33.8		240	301	233	3.8	
17:12:00	63 48.6	167 59.2		228.8	296	226.3	2.2	
17:15:00	63 38.1	168 25.5		228.4	297	228.7	.3	
17:18:00	63 28.7	168 48.7		227.3	295	228.3	L 1.7	
17:21:00	63 19.0	169 13.4		228.7	294	230.1	1.5	
17:23:00	63 12.5	169 29.3		227.7	293	229.9	2.4	
17:26:00	63 02.3	169 53.3		226.2	288			Coast of St Lawrence Island

DAY 073
DATE 3-13-1988

SSM/I VALIDATION
FLIGHT #3
BERING SEA MOSAIC

GMT	LATITUDE	LONGITUDE	ALTITUDE	TRACK	GROUND SPEED	HEADING	DRIFT ANGLE	OUTSIDE AIR TEMPERATURE
17:27:00	63 00.3	169 58.0	20,000 ft					Line 1 Start
17:28:00	62 54.2	170 06.1		209.7	289	214.9	L 5.1	
17:31:00	62 42.4	170 20.2		209.6	287	215.5	6.0	
17:32:00	62 38.2	170 25.3		208.9	289	214.6	5.7	
17:36:00	62 21.4	170 45.8		209.7	290	215.3	5.4	
17:38:00	62 13.0	170 56.0		209.5	291	215.6	5.8	
17:40:00	62 04.6	171 06.0		209.8	288	217.3	7.2	
17:43:00	61 52.1	171 20.9		209.1	283	216.5	7.3	
17:46:00	61 40.3	171 35.1		210.1	270	216.5	1.4	
17:48:00	61 32.7	171 44.8		211.8	266	216.2	L 4.3	
17:51:00	61 21.3	171 58.9		209.4	264	214.7	4.8	
18:04:00	60 28.7	172 56.6		208.9	280	211.8	L 2.8	Polyna, North St Matthews
18:06:00	60 20.6	173 04.9		207.3	280	210.2	3.1	Island.
18:08:00			20,000 ft					end Line 1
18:10:30	60 14.0	172 55.7	20,000 ft	025.7	322	019.8	R 5.8	Start Line 2
18:12:00	60 22.5	172 47.8		023.6	322	018.3	5.2	appears to be right of track
18:13:00	60 26.1	172 44.4		024.2	326	019.5	4.0	St Matthews Island
18:16:00	60 41.0	172 36.3		026.0	327	022.0	4.9	
18:19:00	60 56.9	172 13.7		026.5	328	020.5	5.8	
18:22:00	61 10.1	171 58.7		029.5	330	023.4	5.8	
18:25:00	61 24.6	171 41.8		029.4	330	022.9	6.5	
18:28:00	61 39.0	171 24.9		030.2	330	023.9	6.1	
18:33:00	62 03.0	170 56.6	20,000 ft	029.3	341	022.4	7.7	
18:37:00	62 22.6	170 33.2		028.7	312	021.7	7.2	
18:40:00	62 35.1	170 18.4		028.7	309	021.9	6.8	

DAY 073
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SSM/I VALIDATION
FLIGHT #3
BERING SEA MOSAIC

GMT	LATITUDE	LONGITUDE	ALTITUDE	TRACK	GROUND SPEED	HEADING	DRIFT ANGLE	OUTSIDE AIR TEMPERATURE
18:42:00	62 44.1	170 07.7	20,000 ft	029.5	303	022.3	R 7.2	
18:44:00	62 52.7	169 57.3	20,000 ft	028.8	301	027.0	6.7	
18:46:00	63 01.4	169 46.5		031.8	300	026.9	4.5	
18:48:00	63 10.0	169 35.7		029.8	298	025.8	3.9	end Line 2
18:54:00	63 09.6	169 22.8	20,000 ft	211.9	303	214	L 2.4	Start Line 3
18:56:00	63 00.7	169 34.7		212.2	305	215.3	3.5	
18:58:00	62 52.3	169 46.1		211.8	305	215.2	3.9	
19:01:00	62 38.8	170 03.0		208.4	302	214.0	L 5.8	
19:04:00	62 25.9	170 18.0		207.9	301	213.9	6.0	
19:07:00	62 13.0	170 33.0		208.2	297	214.3	6.0	
19:10:00	61 59.8	170 45.0		208.6	290	215.8	7.4	
19:13:00	61 47.3	171 03.1		210.3	277	217.9	6.6	
19:16:00	61 35.5	171 17.5		209.9	268	216.6	L 6.7	
19:19:00	61 24.5	171 30.9		210.4	262	216.4	5.9	
19:22:00	61 13.3	171 44.1		208.7	260	213.7	6.0	
19:26:30	60 56.1	172 03.6		208.3	263	214.4	6.2	
19:30:00	60 42.5	172 18.3		207.3	263	213.7	L 6.8	
19:34:00	60 27.0	172 34.5		207.1	263	213.7	6.6	
19:37:00	60 16.7	172 45.6						end Line 3
19:39:45	60 18.1	172 32.0	20,000 ft	028.8	323	021.8	R 6.6	Start Line 4
19:42:00	60 29.3	172 20.0		026.4	328	019.3	7.5	
19:45:30	60 46.0	172 02.8	20,000 ft	026.4	329	019.1	7.2	
19:48:00	60 58.1	171 49.7		028.0	328	020.9	6.4	
19:50:00	61 07.9	171 39.2		026.6	326	021.3	5.4	
19:54:00	61 26.8	171 17.1		030.0	329	023.6	6.6	
19:58:00	61 45.4	170 53.2		031.7	328	024.6	6.8	

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SSM/I VALIDATION
FLIGHT #3
BERING SEA MOSAIC

GMT	LATITUDE	LONGITUDE	ALTITUDE	TRACK	GROUND SPEED	HEADING	DRIFT ANGLE	OUTSIDE AIR TEMPERATURE
20:02:00	62 03.9	170 30.4	20,000 ft	029.6	319	021.8	R 7.9	
20:06:00	62 22.0	170 08.7	20,000 ft	029.4	312	022.6	6.9	
20:08:40	62 34.6	169 53.8		027.7	316	022.3	5.6	
20:13:30	62 56.7	169 29.2		025.0	314	021.5	3.4	end Line 4
20:27:00	62 44.3	169 30.3	20,000 ft	210	313	213.7	L 3.8	change tape
20:31:00	62 26.4	169 52.3		210.2	306	215.5	5.2	Start Line 5
20:35:00	62 08.8	170 13.3		209	301	215.9	6.2	
20:41:30	61 41.2	170 46.0		212	271	219.5	7.7	
20:47:00	61 20.3	171 12.2		209.3	271	217.3	L 7.9	
20:50:00	61 08.4	171 25.6		208.2	272	216.6	8.4	
20:52:00	61 00.5	171 34.4		208.6	269	216.5	8.1	
20:54:00	60 52.7	171 43.3		208.8	269	216.3	7.5	
20:56:00	60 44.7	171 52.2		209.6	272	216.7	7.0	
20:59:00	60 32.9	172 05.6		207.7	270	215.7	7.6	
21:01:00	60 24.9	172 14.0		207.4	268	215.3	8.0	
21:03:30	60 15.2	172 24.1		207.0	263	215.7	8.9	
21:06:00	60 05.5	172 33.9	20,000 ft	207.0	261	215.5	8.8	end Line 5
Decend to 5,000 ft								
21:16:30	59 56.0	172 47.6	6,000 ft					
21:18:00	60 01.7	172 39.5		034.0	299	032.6	R 1.5	Low level, Line 5
21:20:00	60 09.7	172 28.7		035.3	293	033.9	1.4	
21:22:00	60 18.0	172 19.4	6,000 ft	028.5	285	027.5	1.2	
21:24:00	60 25.3	172 11.8	6,000 ft	027.1	274	024.6	1.4	
No visibility below 5,000 Ft. No contact with DC-8. Flight safety. Break Track and climb to 20,000 Ft.								

SSM/I VALIDATION
FLIGHT #3
NORTON SOUND INBOUND TRACK

[illegible]

KRMS SYSTEM LOG

SSM/I VALIDATION
FLIGHT #3

GMT TIME	B1	B0	REF LOAD	GAIN	OFFSET	V/H	SCAN RATE MS	ALT	G.S.	COMMENTS
16:30:00	9.5	0	-2.8volts	1.3	4.67	15.2	136	20,000 ft	304 knots	start track over Norton Sound.
16:38:00	9.5	0	-2.8	1.2	4.68	15.4	136	20,000	309	gain & Offset adjust for video.
17:21:00	9.5	0	-2.2	1.2	4.68	15.4	136	20,000	293	St Lawrence Island
17:27:00	9.5	0	-2.2	1.2	4.68	14.4	136	20,000	289	Start Line 1 mosaic 2340 ft.
17:47:00	9.5	0	1.7	1.2	4.68	13.5	150	20,000	270	change scan rate 3100 ft.
18:08:00	9.5	0	-1.5	1.2	4.68	13.5	150	20,000	280	St Matthews Island, end line 1
18:10:45	9.5	0	-1.5	1.2	4.68	16.1	128	20,000	322	start track 2 3880 ft.
18:50:30	9.5	0	-1.1	1.2	4.68	16.1	128	20,000	310	end track 2
18:54:00	9.5	0	1.1	1.2	4.68	15.0	138	20,000	300	start track 3
19:17:15	9.5	0	-1.0	1.2	4.68	13.4	150	20,000	265	change scan rate
19:36:45	9.5	0	-1.0	1.2	4.68	13.4	150	20,000	263	end track 3
19:40:00	9.5	0	-1.0	1.2	4.68	16.1	128	20,000	323	start track 4
20:15:00	9.5	0	-1.0	1.2	4.68	16.1	128	20,000	320	end track 4
20:27:15	9.5	0	-1.0	1.2	4.68	13.5	150	20,000	270	start track 5

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KRMS SYSTEM LOG

GMT TIME	B1	B0	REF LOAD	GAIN	OFFSET	V/H	SCAN RATE MS	ALT	G.S.	COMMENTS
21:06:30	9.5	0	-1.0volt	1.2	4.68	13.5	150	20,000 ft	270knots	end track 5
21:15:00					4.69		54	6,000 ft	230	adjusting for track.
21:16:40	9.5	0	1.0	1.2	4.69	48.8	40	6,000	300	start low level track.
21:23:50	9.5	0	1.0				40			decend to 5,000ft.
21:26:47										flying all over the sky!
21:27:00							41			stop tape
21:35:00	9.5	0	-2.5	1.2	4.69	16.7	124	20,000	334	heading home via Norton Sound
22:17:00										land/sea ice interface
22:40:00	9.5	0	-2.0	1.2	4.68	16.7	124	20,000	330	end last track 4557 ft

NAVIGATION LOG

DAY 074
DATE 3-14-1988

SSM/I VALIDATION
FLIGHT #4
CHUKCHI SEA

GMT	LATITUDE	LONGITUDE	ALTITUDE	TRACK	GROUND SPEED	HEADING	DRIFT ANGLE	OUTSIDE AIR TEMPERATURE
19:16:00	70 12.0	158 37.4	20,000 ft	314.7	358	314.5	R 1.8	Wainwright, AK.
19:20:00	70 29.0	159 26.1		316	356	314	2.0	13nm to coast
19:22:45	70 40.5	159 59.2		316.2	353			over Wainwright
19:25:00	70 50.1	160 28.5		312.7	353	309.2	3.7	fast ice
19:28:00	71 01.9	161 07.6		311.3	350	307.8	R 3.7	first-year ice
19:30:00	71 09.8	161 34.2		309.4	345	305	4.5	Few MY floes
19:33:30	71 22.7	162 21.3		310.5	341	306.4	4.1	My & FY
19:36:00	71 31.8	162 54.9		310.6	335	306.9	3.8	Vast My floe
19:40:00	71 45.8	163 47.6		309.8	329	306.1	3.4	Vast MY floe & smaller my floes
19:43:00	71 56.1	164 27.3		308.9	318	304.5	4.4	
19:46:00	72 06.0	165 06.8		309.3	316	304	5.3	
19:48:00	72 12.6	165 06.8		309.4	314	304.5	5.0	
19:51:00	72 22.4	166 12.8		303.4	314	303.2	5.1	
19:54:00	72 32.1	166 52.9		308.2	311	303	5.4	LG MY Floe, frozen lead
19:56:00	72 38.4	167 20.0		307.3	309	302.4	4.7	
20:00:00	72 50.8	168 15.0		307.4	308	302.1	5.7	
20:02:00	72 57.4	168 44.1	20,000 ft	307.5	306	301.9	5.8	End outbound track
20:06:00	73 15.6	169 00.2	20,000 ft	359	333	354.7	5.6	Line 1 mosaic
20:08:00	73 27.1	168 59.5		000.1	334	354.7	5.4	
20:10:00	73 38.5	168 59.4		359.6	334	353.3	5.7	
20:12:00	73 50.0	168 59.7		000.5	336	354.8	5.5	
20:14:00	74 00.6	168 59.9	20,000 ft	359.4	336	353.3	5.9	turn to course
20:17:00	74 17.2	168 59.9		000.1	333	354.2	5.7	
20:20:00	74 33.8	168 59.6		001.6	333	357.1	2.0	
20:23:00	74 50.4	168 59.4		359.7	332	355.3	4.4	
20:27:00	75 12.5	168 59.1		001.9	334	358.0	3.7	
20:31:00	75 34.6	168 58.7	20,000	001.2	332	358.0	3.1	end line 1

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SSM/I VALIDATION
FLIGHT #4
CHUKCHI SEA MOSAIC

GMT	LATITUDE	LONGITUDE	ALTITUDE	TRACK	GROUND SPEED	HEADING	DRIFT ANGLE	OUTSIDE AIR TEMPERATURE
20:34:00	75 33.3	168 40.8	20,000 ft		279			start line 2
20:37:00	75 18.4	168 41.9	20,000 ft	181.3	287	182.9	L 1.7	left of track, correcting
20:40:00	75 04.0	168 42.8		180.3	290	182.1	1.6	vast floe
20:43:00				179.9	292	182.0	L 2.2	
20:44:00	74 44.4	168 44.1		179.6	293	182.0	2.5	
20:47:00	74 29.9	168 44.3		181.0	294	183.7	2.8	
20:53:00	74 00.5	168 44.2		178.7	295	181.8	L 3.1	
20:56:00	73 45.3	168 42.9		178.6	296	181.9	3.4	
21:00:00	73 26.1	168 42.0		180.3	296	183.3	3.0	
21:03:00	73 11.3	168 42.1		179.9	297	183.1	3.3	
21:05:00	73 01.5	168 41.8	20,000 ft	179.6	298	183.1	3.5	end line 2
21:09:00	73 10.8	168 23.7	20,000 ft	355.6	326	348.6	R 7.0	Start line 3
21:12:00	73 27.2	168 26.1		359.1	332	352.5	6.4	
21:15:00	73 43.8	168 27.5		358.3	333	351.4	6.8	
21:18:00	74 00.5	168 29.4		357.4	335	350.6	6.8	turns
21:21:00	74 22.9	168 29.7		000.7	338	354.4	6.3	
21:25:00	74 39.9	168 29.2		000.9	338	355.1	5.8	
21:28:00	74 56.6	168 29.8		359.1	338	353.7	5.5	
21:31:00	75 13.5	168 29.6		001.2	338	356.2	5.1	
21:35:00	75 35.8	168 30.6	20,000 ft	358.4	332	354.0	4.4	end line 3
21:39:00	75 37.7	168 03.7	20,000	185.3	283	187.5	L 2.3	Start line 4
21:41:00	75 28.3	168 03.7		186.8	287	189.0	2.2	
21:44:00	75 13.9	168 10.3		180.2	291	182.6	2.4	
21:47:00	74 58.6	168 12.1		179.0	292	180	1.3	
21:50:00	74 44.9	168 12.9		181.6	291	182.5	0.9	
21:53:00	74 30.3	168 13.5	20,000 ft	179.0	292	180.5	1.5	

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SSM/I VALIDATION
FLIGHT #4
CHUKCHI SEA MOSAIC

GMT	LATITUDE	LONGITUDE	ALTITUDE	TRACK	GROUND SPEED	HEADING	DRIFT ANGLE	OUTSIDE AIR TEMPERATURE
21:56:00	74 15.7	168 13.7	20,000 ft	180.1	293	181.3	L 1.1	line 4
22:00:00	73 56.0	168 13.8		179.2	295	180.4	1.2	
22:04:35	73 33.5	168 12.5		178.8	298	180.1	1.6	
22:07:00	73 21.6	168 11.3		178.4	298	180.2	1.8	
22:11:00	73 01.8	168 09.0		177.9	299	180		end line 4
22:14:00	73 04.1	167 44.5	20,000 ft	004	323	358.7	R 4.5	start line 5
22:17:00	73 20.1	167 45.3		357.8	326	352.3	5.6	
22:20:00	73 20.1	167 48.8		355.9	328	349.6	6.3	
22:23:00	73 52.9	167 54.3		353.4	326	346.4	7.0	
22:26:00	74 08.9	167 58.5		002.2	333	355.2	6.8	
22:29:00	74 25.5	167 58.5		359.6	333	352.5	7.1	
22:33:00	74 50.9	167 57.4		000.3	337	353.4	6.8	
22:37:00	75 10.2	167 56.9		359.7	337	353.4	6.4	
22:39:00	75 21.4	167 56.9		359.7	336	352.9	6.7	
22:42:00	75 38.1	167 58.1	20,000 ft	358.7	335	352.3	6.4	end line 5
22:45:00	75 33.2	167 36.2	20,000 ft	180.8	286	183.7	L 4.6	Start line 6
22:48:00	75 19.0	167 37.4		181.0	285	182.4	L 4.4	
22:51:00	75 04.6	167 36.6		178.5	284	182.3	3.6	
22:54:00	74 45.9	167 37.9		181.4	284	185.0	3.5	
22:58:00	74 31.6	167 36.5		178.1	288	181.4	3.2	
23:02:00	74 12.3	167 34.7		178.9	291	181.2	2.3	
23:06:00				180.2	294	181.6		
23:06:30	73 50.5	167 34.6		178.3	294	180.1	1.8	
23:09:00	73 38.2	167 33.2		178.8	295	180.5	1.7	
23:13:00	73 18.5	167 32.2		181.1	296	182.6	0.9	
23:17:00	72 58.8	167 34.3	20,000 ft	181.9	297	182.6	1.0	end line 6

SSM/I VALIDATION
FLIGHT #4
CHUKCHI SEA AREA

[illegible]

SSM/I VALIDATION
FLIGHT #4
CHUKCHI SEA INBOUND

[illegible]

DAY 074
DATE 3-14-1988

KRMS SYSTEM LOG

SSM/I VALIDATION
FLIGHT #4

GMT TIME	B1	B0	REF LOAD	GAIN	OFFSET	V/H	SCAN RATE MS	ALT	G.S.	COMMENTS
19:15:00	9.5	0	-2.1volts	1.2	4.68	18	115	20,000 ft	360knots	tundra lakes, outbound leg
19:22:45	9.5	0	-2.0	1.2	4.68	18	115	20,000	360	Wainwright, AK.
19:31:00	9.5	0	-2.0	1.2	4.68	17.5	115	20,000	350	begin multi-year ice zone
19:40:00	9.5	0	-2.0	1.2	4.68	16	130	20,000	320	change scan rate
20:03:00	9.5	0	-2.0	1.2	4.68	15.5	130	20,000	310	end outboard leg
20:05:45	9.5	0	-1.7	1.2	4.68	16.7	125	20,000	335	start leg 1 mosaic
20:31:00	9.5	0	-1.6	1.2	4.68	16.7	125	20,000	334	end leg 1
20:34:15	9.5	0	-1.5	1.2	4.68	14	148	20,000	280	start leg 2 mosaic
21:05:00	9.5	0	-1.2	1.2	4.68	14	148	20,000	284	end leg 2
21:08:00	9.5	0	1.2	1.2	4.68	16.2	127	20,000	325	start leg 3 mosaic
21:35:50	9.5	0	-1.5	1.2	4.68	16.2	127	20,000	332	end leg 3
21:39:15	9.5	0	-1.5	1.2	4.68	14.1	145	20,000	283	start leg 4 mosaic
22:11:08	9.5	0	-1.2	1.2	4.68	14.5	145	20,000	291	end leg 4
22:14:00	9.5	0	-1.2	1.2	4.68	16.5	126	20,000	330	start leg 5 mosaic

DAY 074
DATE 3-14-1988

SSM/I VALIDATION
FLIGHT #4

GMT TIME	B1	B0	REF LOAD	GAIN	OFFSET	V/H	SCAN RATE MS	ALT	G.S.	COMMENTS
22:42:00	9.5	0	-1.2volts	1.2	4.68	16.5	126	20,000 ft	335knots	end leg 5
22:45:00	9.5	0	-1.1	1.2	4.68	14.3	146	20,000	285	start leg 6 mosaic
23:17:00	9.5	0	-1.0	1.2	4.68	14.3	146	20,000	285	end leg 6
23:37:00	9.5	0	-1.7	1.3	4.67	50	41	5,000	250	low level diagonal
23:55:20	9.5	0	-2.0	1.3	4.67	50	41	5,000	250	end diagonal track
23:57:30	9.5	0	-2.0	1.3	4.67	51.6	40	5,000	258	start crossing track
24:03:20	9.5	0	-2.0	1.3	4.67	51.6	40	5,000	258	end crossing track
075:00:12:30	9.5	0	-2.2	1.3	4.67	15.5	138	20,000	310	inbound toward Barrow, AK.
00:31:00			-2.31							climbing, aspects off
00:37:00	9.5	0	-2.3	1.3	4.67	13.0	157	25,000	330	changed scan rate
00:55:13	9.5	0	-1.8	1.3	4.67	13.2	157	25,000	330	Point Barrow area
01:40:00	9.5	0	-1.8	1.3	4.67	13.2	157	25,000	330	end of mission

DAY 069
DATE 3-8-1988

SSM/I VALIDATION
FLIGHT #1
CHUKCHI SEA MOSAIC, CAPE LISBURNE

GMT TIME	B1	B0	REF LOAD	GAIN	OFFSET	V/H	SCAN RATE MS	ALT	G.S.	COMMENTS
01:08:05	+9.5	0	-5.7Volts	1.22	4.64	46	46.4	5,000	232	Tape Started 200' before beginning of track
01:12:24	+9.5	0	-5.7	1.22	4.64	46	46.4	5,000	238	End of Track
01:18:40	+9.5	0	-5.7	1.10	4.72	45.8	45.28	5,000	230	start track 2 9% off aspect
01:26:50	+9.5	0	-5.7	1.10	4.72	45.0	45.0	5,000	248	end of track 2
01:28:53	+9.5	0	-5.7	1.10	4.72	48.0	43.2	5,000	247	start track 3
01:35:42	+9.5	0	-5.7	1.10	4.72	48.0	43.0	5,000	247	end of track 3
02:50:00	+9.5	0	-3.0	1.30	4.64	14.8	139	20,000	297	start track, kotzebue
02:52:00	+9.5	0	-3.0	1.30	4.64	15.5	133	20,000	310	adjust for V/H
03:02:00	+9.5	0	-2.5	1.30	4.64	15.5	133	20,000	313	Ref Load Temp channe
03:22:40	+9.5	0	-2.5	1.30	4.64	15.5	133	20,000	317	end track, Kotezebue sound
03:25:55	+9.5	0	-2.5	1.30	4.64	16.5	125	20,000	331	start track 2, Cape Lisburne
03:39:00	+9.5	0	-2.5	1.30	4.64	16.3	127	20,000	326	Mosaic line 1
03:59:45	+9.5	0	-2.0	1.30	4.64	16.0	127	20,000	320	end of line 1
04:04:04	+7.5	0	-2.0	1.30	4.64	13.6	152	20,000	273	start mosaic line 2

DAY 069
DATE 3-8-1988

SSM/I VALIDATION
FLIGHT #1
CHUKCHI SEA MOSAIC, CAPE LISBURNE

GMT TIME	B1	B0	REF LOAD	GAIN	OFFSET	V/H	SCAN RATE MS	ALT	G.S.	COMMENTS
04:29:22	9.5	0	-2.0	1.30	4.64		149	20,000	277	end mosaic line 2
04:32:30	9.5	0	-2.0	1.3	4.64	16.3	127	20,000	332	start mosaic line 3
04:53:00	9.5	0	-1.8	1.3	4.64	16.8	127	20,000	338	end mosaic line 3
04:56:00	9.5	0	-1.8	1.3	4.64	13.7	150	20,000	277	start mosaic line 4
05:20:40	9.5	0	-1.8	1.30	4.64	14.6	150	20,000	293	end mosaic line 4
05:23:25	9.5	0	-1.7	1.30	4.64	16.4	126	20,000	329	start mosaic line 5
05:46:20	9.5	0	-1.7	1.30	4.64	16.4	126	20,000	330	end mosaic line 5
06:00:00	9.5	0	-1.7	1.30	4.64	14.6	143	20,000	290	multi-year ice turns pulled data tape
06:06:40	9.5	0	-1.7	1.30	4.64	13.5	153	20,000	269	start mosaic line 6
06:32:10	9.5	0	-1.5	1.30	4.64	14.3	145	20,000	286	end mosaic line 6
06:36:00	9.5	0	-1.5	1.30	4.64	16.8	123	20,000	337	start mosaic line 7
06:56:00	9.5	0	-1.5	1.30	4.64	16.8	123	20,000	341	end mosaic line 7
06:58:45	9.5	0	-1.5	1.30	4.64	13.8	150	20,000	276	start mosaic line 8
07:24:25	9.3	0	-1.5	1.30	4.64	13.8	150	20,000	277	end mosaic line 8

DAY 069
DATE 3-8-1988

SSM/I VALIDATION
FLIGHT #1
CHUKCHI SEA MOSAIC, CAPE LISBURNE

GMT TIME	B1	B0	REF LOAD	GAIN	OFFSET	V/H	SCAN RATE MS	ALT	G.S.	COMMENTS
07:27:00	9.5	0	-1.5	1.30	4.64	16.8	123	20,000	336	start mosaic line 9
07:47:03	9.5	0	-1.5	1.30	4.64	17.0	123	20,000	340	end mosaic line 9
07:52:00	9.5	0	-1.5	1.30	4.64	13.9	150	20,000	278	start mosaic line 10
08:14:00	9.5	0	-1.5	1.30	4.64	13.9	150	20,000	278	end mosaic line 10
08:15:50	9.5	0	-1.5	1.30	4.64	17.0	121	20,000	340	start mosaic line 11
08:25:10	9.5	0	-1.5	1.30	4.64	17.0	121	20,000	340	end mosaic line 11
08:27:15	9.5	0	-1.5	1.30	4.64	13.7	150	20,000	275	start mosaic line 12
08:36:35	9.5	0	-1.5	1.3	4.64	13.7	150	20,000	275	end mosaic line 12

Lines 11 & 12 are short lines.
Turns during data lines will cause problems.

DAY 071
DATE 3-11-1988

SSM/I VALIDATION
FLIGHT #2

GMT TIME	B1	B0	REF LOAD	GAIN	OFFSET	V/H	SCAN RATE MS	ALT	G.S.	COMMENTS
16:05:00	9.5V	0	-4.5volts	1.3	4.67	15.9	122	20,000ft	339knots	Brooks Range, start at 300ft.
16:07:00	9.5	0	-4.5	1.3	4.67		130	20,000	319	change scan speed, clouds.
16:30:35	9.5	0	-3.5	1.3	4.67	16.3	130	20,000	327	3% error in aspect ratio
16:36:00	9.5	0	-3.5	1.3	4.67	16.5	125	20,000	331	start ice mapping, 1475 ft.
16:53:30	9.5	0	-3.5	1.3	4.67	17.1	125	20,000	343	3% error in aspect ratios
17:03:58	9.5	0	-3.0	1.3	4.67	17.1	125	20,000	343	ice camp, edge of multi-year ice.
17:11:30										Big crack, dark nilas no water.
17:18:00										first-year ice.
17:20:00	9.5	0	-3.0	1.3	4.67	17.5		20,000	350	5% off aspect ratio
17:21:00	9.5	0	-3.0	1.3	4.67	17.6	128	20,000	352	change scan speed
17:28:00	9.5	0	-3.0	1.3	4.67	17.6	118	20,000	360	interesting area First-year.
17:44:00	9.5	0	-3.0	1.3	4.67	18.6	111	20,000	372	changed scan rate
17:49:00	9.5	0	-3.0	1.3	4.67	18.6	111	20,000	272	solid cloud cover
17:50:40										climbing to 22,000ft aspects will be off

DAY 071
DATE 3-11-1988

SSM/I VALIDATION
FLIGHT #2

GMT TIME	B1	B0	REF LOAD	GAIN	OFFSET	V/H	SCAN RATE MS	ALT	G.S.	COMMENTS
17:58:00	9.5V	0	-3.0volts	1.3	4.67	14.9	138	22,000ft	328knots	
17:59:00	9.5	0	-3.0	1.3	4.67	15.6	132	22,000	344	change scan rate
18:00:18	9.5	0	-3.0	1.3	4.67	16.6	125	22,000	363	change scan rate
18:02:30	9.5	0	-3.0	1.3	4.67	17.5	118	22,000	386	change scan rate
18:10:00							154	23,000	323	climbing, aspects off
18:13:30	9.5	0	-3.0	1.3	4.67	13.6	151	24,000	328	change scan rate
18:14:00	9.5	0	-3.0	1.3	4.67	13.6	151	24,000	328	interesting area, poss open water.
18:30:00										descent to 20,000 ft
18:39:00	9.5	0	-3.0	1.3	4.67	17.3	119	20,000	347	change scan rate
19:03:45	9.5	0	-3.0	1.3	4.67	17.3	119	20,000	340	poss ice island fragment.
19:51:00	9.5	0	-3.0	1.3	4.67	17.3	119	20,000	331	end track at 8800ft on tape.
20:07:00	9.5	0	-2.5	1.3	4.67	15.1	137	20,000	302	start inbound track, new tape.
20:15:00	9.5	0	-2.5	1.3	4.67	14.1	147	20,000	282	change scan rate
20:50:30										course change

DAY 071
DATE 3-11-1988

SSM/I VALIDATION
FLIGHT #2

GMT TIME	B1	B0	REF LOAD	GAIN	OFFSET	V/H	SCAN RATE MS	ALT	G.S.	COMMENTS
21:36:00	9.5	0	-3.0	1.3	4.67	14.4	147	20,000 ft	288knots	few dropouts, cause unknown
21:45:50	9.5	0	-3.0 volts	1.3	4.67	12.5	147	20,000	250	entering area of first-year ice
21:50:00										possible open water
22:01:30	9.5	0	-3.5	1.3	4.67	12.2	170	20,000	244	change scan rate, head winds
22:25:15	9.5	0	-3.5	1.3	4.67	12.2	170	20,000	248	large flow, looks neat
22:28:00	9.5	0	-3.5	1.3	4.67	13.8	150	20,000	276	change scan rate
22:35:20	9.5	0	-3.5	1.3	4.67		150	20,000	282	open water, new ice
22:39:20	9.5	0	-3.5	1.3	4.67		150	20,000	280	nice large floe
23:16:00	9.5	0	-3.5	1.3	4.67		140	20,000	293	change scan rate
23:32:01	9.5	0	-3.5	1.3	4.67		140	20,000	302	very high Tb, new ice
23:39:00	9.5	0	-3.5	1.3	4.67	16	129	20,000	320	change scan rate
23:54:00	9.5	0	-3.5	1.3	4.67	16	129	20,000	320	end track

SSM/I VALIDATION
FLIGHT #2
FAIRBANKS LOCAL

[illegible]SSM/I VALIDATION
FLIGHT #3

GMT TIME	B1	B0	REF LOAD	GAIN	OFFSET	V/H	SCAN RATE MS	ALT	G.S.	COMMENTS
16:30:00	9.5	0	-2.8volts	1.3	4.67	15.2	136	20,000 ft	304 knots	start track over Norton Sound.
16:38:00	9.5	0	-2.8	1.2	4.68	15.4	136	20,000	309	gain & Offset adjust for video.
17:21:00	9.5	0	-2.2	1.2	4.68	15.4	136	20,000	293	St Lawrence Island
17:27:00	9.5	0	-2.2	1.2	4.68	14.4	136	20,000	289	Start Line 1 mosaic 2340 ft.
17:47:00	9.5	0	1.7	1.2	4.68	13.5	150	20,000	270	change scan rate 3100 ft.
18:08:00	9.5	0	-1.5	1.2	4.68	13.5	150	20,000	280	St Matthews Island, end line 1
18:10:45	9.5	0	-1.5	1.2	4.68	16.1	128	20,000	322	start track 2 3880 ft.
18:50:30	9.5	0	-1.1	1.2	4.68	16.1	128	20,000	310	end track 2
18:54:00	9.5	0	1.1	1.2	4.68	15.0	138	20,000	300	start track 3
19:17:15	9.5	0	-1.0	1.2	4.68	13.4	150	20,000	265	change scan rate
19:36:45	9.5	0	-1.0	1.2	4.68	13.4	150	20,000	263	end track 3
19:40:00	9.5	0	-1.0	1.2	4.68	16.1	128	20,000	323	start track 4
20:15:00	9.5	0	-1.0	1.2	4.68	16.1	128	20,000	320	end track 4
20:27:15	9.5	0	-1.0	1.2	4.68	13.5	150	20,000	270	start track 5

DAY 073
DATE 3-13-1988

GMT TIME	B1	B0	REF LOAD	GAIN	OFFSET	V/H	SCAN RATE MS	ALT	G.S.	COMMENTS
21:06:30	9.5	0	-1.0volt	1.2	4.68	13.5	150	20,000 ft	270knots	end track 5
21:15:00					4.69		54	6,000 ft	230	adjusting for track.
21:16:40	9.5	0	1.0	1.2	4.69	48.8	40	6,000	300	start low level track.
21:23:50	9.5	0	1.0				40			decend to 5,000ft.
21:26:47										flying all over the sky!
21:27:00							41			stop tape
21:35:00	9.5	0	-2.5	1.2	4.69	16.7	124	20,000	334	heading home via Norton Sound
22:17:00										land/sea ice interface
22:40:00	9.5	0	-2.0	1.2	4.68	16.7	124	20,000	330	end last track 4557 ft

APPENDIX B: COMPARISON OF LTN-72 NAVIGATION SYSTEM AND THE OMEGA (LTN-211) NAVIGATION SYSTEM

3/8/1988

SSM/I VALIDATION FLIGHT #1

TIME	LTN-72		LTN-211	
	LATITUDE	LONGITUDE	LATITUDE	LONGITUDE
00:50	64 39.0	147 03.4		
01:08			64 42.3	148 07.0
01:13			64 52.0	147 33.0
01:19			64 49.3	147 40.5
01:28			64 23.8	146 46.8
01:29			64 19.6	146 44.5
01:36			64 11.0	145 41.1
02:57			66 38.6	161 15.2
03:03	66 54.8	162 30.2	66 53.7	162 31.2
			66 53.2	162 32.2*
03:07			67 03.8	163 11.7
03:15			67 14.3	164 51.6
03:22			67 32.9	166 19.7
03:39			69 00.9	165 56.8
03:55			70 26.3	165 48.1
04:04			70 46.2	165 34.0
04:07			70 33.8	165 42.2
04:11			70 14.7	165 41.4
04:20			69 38.0	165 40.4
04:27			69 02.3	165 41.4
04:30			68 49.1	165 41.9
04:33			69 00.0	165 31.9
04:36			69 23.8	165 33.7
04:56			70 48.2	165 24.5
05:00			70 28.3	165 21.7
05:11			69 39.4	165 15.5
05:15			69 16.9	165 13.3
05:19			68 59.3	165 11.2
05:24			68 56.9	164 55.6
05:38			70 19.8	164 52.2
05:46			70 01.5	164 53.4
06:07			70 50.4	164 59.6
06:15			70 15.3	164 00.2
06:30			69 00.1	164 53.3
06:36			68 58.0	164 36.1
06:44			69 42.7	164 29.7
06:56			70 49.2	164 18.3
07:00			70 49.4	164 07.1
07:08			70 09.3	164 09.1
07:23			69 00.6	164 20.2
07:28			69 00.8	164 13.5
07:33			69 32.4	164 17.2
07:40			70 11.9	164 19.7
07:47			70 49.1	164 18.8
07:52			70 39.4	164 06.1
08:00			70 03.6	163 56.3
08:05			69 42.8	163 51.2
08:14			69 00.7	163 43.0
08:16			69 02.6	163 30.2
08:22			69 34.4	163 27.1
08:25			69 54.9	163 24.6
08:27			69 54.6	163 12.3
08:36			69 14.7	163 14.3

ACTUAL VALUES UPON RETURN TO EIELSON AFB, FAIRBANKS, AK.
64 39.2 147 04.6

10:24 64 34.3 147 04.2 64 38.5 147 06.0

3/11/1988

SSM/I VALIDATION FLIGHT #2

TIME	LTN-72		LTN-211	
	LATITUDE	LONGITUDE	LATITUDE	LONGITUDE
15:28	64 40	147 05.9		
15:39	65 10.1	147 02.7	65 09.3	147 00.2
15:46	65 39.5	147 00.8	65 38.7	146 58.9
16:34	69 55.2	146 40.5	65 54.4	146 38.3
16:39	70 26.2	146 08.7	70 24.0	146 04.9
16:55			71 40.4	144 32.9
17:04	72 32.4	143 21.8	72 30.5	143 23.4
17:21			73 58.6	141 09.6
17:33			75 02.5	139 11.8
17:36			75 22.8	138 31.7
17:44			76 03.6	137 06.4
17:57			77 14.3	134 15.3
18:07			78 00.8	131 41.0
18:10			78 17.6	130 54.2
18:13	78 30.3	129 42.8	78 30.2	130 07.5
18:21	79 10.1	126 57.5	79 09.0	127 24.0
18:30	79 51.7	124 21.8	LOST OMEGA SYSTEM	
19:16	82 42.0	101 51.6		
21:35	79 25.7	126 44.5		
22:00	78 05.6	132 10.0		
22:11	77 28.7	133 54.7		
22:26	76 30.2	136 31.6		
22:36	75 48.3	138 04.7		

3/11/1988

SSM/I VALIDATION FLIGHT #2

TIME	LTN-72		LTN-211	
	LATITUDE	LONGITUDE	LATITUDE	LONGITUDE
15:28	64 40	147 05.9		
15:39	65 10.1	147 02.7	65 09.3	147 00.2
15:46	65 39.5	147 00.8	65 38.7	146 58.9
16:34	69 55.2	146 40.5	65 54.4	146 38.3
16:39	70 26.2	146 08.7	70 24.0	146 04.9
16:55			71 40.4	144 32.9
17:04	72 32.4	143 21.8	72 30.5	143 23.4
17:21			73 58.6	141 09.6
17:33			75 02.5	139 11.8
17:36			75 22.8	138 31.7
17:44			76 03.6	137 06.4
17:57			77 14.3	134 15.3
18:07			78 00.8	131 41.0
18:10			78 17.6	130 54.2
18:13	78 30.3	129 42.8	78 30.2	130 07.5
18:21	79 10.1	126 57.5	79 09.0	127 24.0
18:30	79 51.7	124 21.8	LOST OMEGA SYSTEM	
19:16	82 42.0	101 51.6		
21:35	79 25.7	126 44.5		
22:00	78 05.6	132 10.0		
22:11	77 28.7	133 54.7		
22:26	76 30.2	136 31.6		
22:36	75 48.3	138 04.7		

3/13/1988

SSM/I VALIDATION FLIGHT #3

TIME	LTN-72		LTN-211	
	LATITUDE	LONGITUDE	LATITUDE	LONGITUDE
15:25	64 46.4	147 41.8	64 45.3	147 46.2
15:40	64 43.1	150 40.1	64 41.1	150 42.3
16:03	64 31.2	154 58.2	64 29.6	155 00.2
16:15	64 21.4	157 09.0	64 18.8	157 10.4
16:35	64 00.5	160 57.8	63 58.7	160 58.8
16:55	64 02.4	164 53.5	64 02.5	164 56.9
17:03	64 01.5	166 21.7	64 01.0	166 25.7
17:21	63 19.0	169 13.4	63 28.5	169 11.8
17:26	63 00.3	169 58.0	63 09.0	169 56.6
17:34	62 27.9	170 37.8	62 36.6	170 35.8
17:40	62 03.4	171 07.4	62 11.0	171 06.7
17:48	61 31.5	171 46.4	61 39.5	171 43.7
17:54	61 07.4	172 14.6	61 15.5	172 11.6
18:00	60 46.0	172 37.8	60 54.4	172 35.2
18:08	60 25.6	173 04.9		
18:10	60 14.0	172 55.7	60 22.6	172 54.0
18:20	61 00.4	172 09.6	61 07.3	172 10.9
18:26	61 32.5	171 32.6	61 39.6	171 35.0
18:40	62 35.1	170 18.4	62 43.4	170 17.8
18:46			63 11.5	167 41.9
18:58	62 53.3	169 46.1	63 03.6	169 36.5
19:04	62 25.9	170 18.0	62 35.3	170 09.4
19:10	61 59.8	170 48.0	62 00.4	170 47.2
19:13			61 47.6	171 02.5
19:22			61 14.8	171 45.6
19:26			60 57.0	172 04.5
19:34			60 26.9	172 42.1
19:37			60 16.0	172 54.4
19:40			60 17.4	172 43.1
19:42			60 29.0	172 31.9
19:48			60 57.1	172 03.5
19:54			61 24.9	171 30.6
19:58			61 44.4	171 07.6
20:01			62 22.8	170 19.7
20:13			62 58.3	169 34.0
20:27			62 47.4	169 27.2
20:41			61 43.2	170 39.9
20:47			61 22.7	171 07.8
21:02	60 21.1	172 18.1	60 21.6	172 24.1
21:06			60 05.7	172 43.6
21:16			59 55.7	173 01.7
21:20			60 09.1	172 44.1
21:35			60 43.1	171 41.6
21:39			60 58.2	171 08.1
21:44			61 17.7	170 21.0
21:50			61 38.3	169 28.0
21:58			62 04.0	168 05.8
22:16			62 53.5	165 05.2
22:22			63 12.2	164 04.9
22:30			63 35.4	162 44.8

SSM/I VALIDATION FLIGHT #4 14 MARCH 1988

TIME	LTN-72		LTN-211	
	LATITUDE	LONGITUDE	LATITUDE	LONGITUDE
17:59	64 38.8	147 04.9	64 39.7	147 04.8
18:16	65 40.3	148 39.3	65 40.0	148 39.1
18:40	67 28.7	152 05.5	67 28.2	152 05.7
18:55	68 38.0	154 40.9	68 38.3	154 37.8
19:11	69 46.2	157 35.1	69 50.3	157 32.6
19:22	70 40.5	159 59.5	70 42.8	159 58.9
19:31	71 14.1	161 50.1	71 15.5	161 48.9
19:43	71 57.1	164 31.2	71 58.3	164 29.8
20:03	73 00.1	168 56.5		
20:06	73 15.6	169 00.0	73 16.7	168 58.5
20:17	74 17.2	168 59.9	74 17.0	169 00.0
20:20	74 33.8	168 59.6	74 34.1	169 00.0
20:27	75 14.7	168 59.0	75 14.2	169 04.9
20:31	75 34.6	168 58.7		
20:33	75 33.3	168 40.8	75 32.6	168 59.2
20:42	74 51.8	168 43.8	74 52.1	168 48.8
20:53	74 00.5	168 44.2		
20:54	73 54.7	168 43.8	73 56.1	168 39.9
21:00	73 26.1	168 42.0	73 27.2	168 36.8
21:07	73 02.2	168 21.6	73 03.5	168 19.8
21:10	73 17.9	168 25.5	73 18.6	168 25.7
21:22			74 21.5	168 34.4
21:35			75 34.5	168 42.5
21:39			75 35.8	168 26.4
21:44			75 13.1	168 27.4
21:50			74 44.6	168 18.4
21:56			74 16.7	168 13.0
22:06			73 28.6	168 04.5
22:07			73 23.6	168 03.5
22:11			73 03.8	167 59.9
22:20			73 37.0	167 43.1
22:26			74 08.7	167 54.1
22:37			75 08.7	168 05.1
22:41			75 31.0	168 12.5
22:42			75 36.8	168 14.2
22:45			75 31.9	168 05.1
22:48			75 18.1	168 05.6
22:55			74 45.4	167 56.1
23:02			74 13.1	167 48.6
23:13			73 19.1	167 42.5
23:17			72 59.3	167 41.6
23:37			72 58.7	167 43.0
23:45	73 34.0	168 14.6	73 30.5	168 29.3
23:55	74 12.2	168 58.2	74 10.7	167 16.0
23:57	74 17.0	168 41.5		
23:59	74 17.6	168 04.6	74 15.1	168 23.3
00:03	74 18.2	167 03.6	74 17.1	167 21.1
00:10	73 55.8	165 45.6	74 01.6	165 56.0
00:26	72 54.4	162 40.2	73 03.8	162 33.2
00:30	72 41.3	162 00.0	72 50.7	161 51.5
00:40	72 09.3	159 54.5	72 16.6	159 46.8
00:55	71 15.7	156 44.9	71 20.8	156 45.5
01:04	70 38.0	155 25.7	70 43.0	155 31.8
01:17	69 33.7	153 39.2	69 34.4	153 48.6
01:27	68 47.5	152 28.8	68 55.5	152 34.4
01:40	67 48.7	151 00.5	67 57.8	150 56.6
01:49	67 07.5	150 04.6	67 16.7	149 55.3
02:01	66 15.2	148 55.3	66 23.9	148 47.2
02:09	65 40.6	148 12.0	65 48.0	148 07.5
02:34	64 37.9	146 51.4	64 46.6	146 59.4
LTN-72 6 NM OFF			LTN-211 7 NM OFF	

APPENDIX C: COPY OF THE NAVPOLAROCEANCEN ICE OBSERVER REPORT

JOINT MESSAGEFORM 1										UNCLASSIFIED	
PAGE	DATE	TIME	FROM	TO	CLASS	SPEC AT	EXT	CH	NO. OF LINES	MESSAGE HANDLING INSTRUCTIONS	
02	04										
<p>1745/ 77610013646 20998 55612 10/77 946// 700A0</p> <p>1940/ 78321 08424 2099A 558/0 11065 646// 743A0</p> <p>1945/ 78328 08000 2099A 557/0 12067 646// 743A0</p> <p>1950/ 78329 07640 20998 558/0 01/67 846// 70080</p> <p>1952/ 78329 07555 20998 TURN/</p> <p>1955/ 78328 07610 20998 558/0 11/67 846// 70080</p> <p>2000/ 78322 08020 2099A 558/0 11067 846// 72390</p> <p>2005/ 78317 08515 2099A 558/1 01067 846// 73390</p> <p>2010/ 78312 08710 2099A 558/0 11067 746// 73290</p> <p>2015/ 78306 09056 2099A 558/0 11067 746// 73390</p> <p>2020/ 78300 09401 2099A 557// 12076 746// 763A0</p> <p>2025/ 78253 09640 20998 558// 11/77 746// 70080</p> <p>2030/ 78242 09958 1099A 557// 12075 ///// 733A0</p> <p>2. BERING SEA - 13 MAR 88:</p> <p>1650/ 76403 16347 0599A 55/// 27153 370// 71280</p> <p>1655/ 76402 16448 0599A 55/// 45153 571// 73280</p> <p>1700/ 76401 16548 1099A 55/// 35243 370// 71180</p> <p>1705/ 76401 16648 1099A 55/// 54154 517// 71570</p> <p>1710/ 76353 16745 1599A 55/// 54153 417// 73570</p>											
DISTR											
DRAFTER TYP. NAME TITLE OFFICE PHONE						SPECIAL INSTRUCTIONS					
TYPED NAME TITLE OFFICE PHONE						SIGNATURE					
UNCLASSIFIED											

DD FORM 173/2

JOINT MESSAGEFORM										UNCLASSIFIED	
PAGE	DATE	TIME	PRECEDENCE	CLASS	SPECIAL	REF	FILE	NO	NP0C		
01 of 04	140200Z	MAR 88	PP PP	UUUU					NP0C 140200		
FROM NAVPOLAROCEANCEN ICE OBSERVER EIELSON AFB AK											
TO NAVPOLAROCEANCEN SUITLAND MD											
UNCLAS //NO3140//											
SUBJ: AERIAL ICE OBSERVATIONS 11 AND 13 MARCH 1988											
1. BEAUFORT SEA - 11 MAR 88:											
1635/ 77007 14628 20998 55/80 ///88 00000 70090											
1640/ 77032 14601 2099A 55/44 10065 823// 74390											
1645/ 77053 14554 2099A 55/53 10075 823// 74290											
1650/ 77121 14400 2099A 55/53 01075 823// 74290											
1655/ 77146 14428 2099A 55/53 10076 921// 73390											
1700/ 77213 14351 2099A 55/34 20074 912// 73390											
1705/ 77239 14310 2099A 55033 30075 924// 73390											
1710/ 77302 14231 2099A 55422 10075 942// 75390											
1715/ 77330 14150 2099A 55422 10077 943// 73490											
1720/ 77354 14112 2099A 55224 10075 824// 73490											
1725/ 77423 14025 2099A 55422 10076 836// 76490											
1730/ 77449 13906 20998 55512 10077 946// 70090											
1735/ 77514 13840 20998 55513 10/76 946// 74290											
1740/ 77546 13736 20998 55513 10/77 946// 700A0											
DISTR											
DRAFTER TYPED NAME TITLE DUTY STATION PHONE											
D.A. OLSEN AG2 USN 377-3140											
TYPED NAME TITLE DUTY STATION PHONE											
W.L. MILLER SSGT WEB 377-3140											
SIGNATURE											
Wayne L. Miller											
UNCLASSIFIED											
DD FORM 173/2											



JOINT MESSAGE FORM										UNCLASSIFIED	
PAGE	DATE	TIME	FROM	TO	CLASS	REMARKS	NO.	BY	DATE	TIME	
03	04										
MESSAGE HANDLING INSTRUCTIONS											
1715/ 763380 16825 1599A 55//1 44253 610// 73270 1720/ 76320 16905 1599B 55/// 8//88 000// 70050 1725/ 76307 16948 1599/ TURN/ 1727/ 76300 16958 15999 55/// /363X 770// 79130 1730/ 76240 17018 1599A 55/// 18164 717// 73430 1735/ 76220 17042 1599B 55/// 53254 717// 70040 1740/ 76204 17156 1599A 55/// 62253 710// 72040 1745/ 76146 17128 1099A 55//0 72154 710// 72240 1830/ 76148 17014 1099A 55//0 72154 ///// 71050 1835/ 76211 17048 1099A 55//0 63153 717// 71550 1840/ 76235 17018 1099A 55/// 26263 771// 71550 1845/ 76257 16951 1099A 55/// /644X 770// 71340 1850/ 76309 16930 1099/ TURN/ 1855/ 76305 16928 10999 55/// /09XX 570// 76420 1900/ 76256 16955 1599A 55/// /916X 470// 71330 1905/ 76220 17020 2099B 55/// 0916X 371// 70050 1910/ 76159 17048 2099B 55/// /8//7 770// 70080 1915/ 76139 17113 1099A 55/// 17273 771// 74480 1935/ 76026 17236 1099B 55//0 16153 771// 79130											
DISTR											
DRAFTER TYPED NAME TITLE OFFICE PHONE NUMBER TYPED NAME TITLE OFFICE PHONE NUMBER SIGNATURE											
UNCLASSIFIED											

DD FORM 173/2

JOINT MESSAGE FORM				UNCLASSIFIED			
PAGE	DATE	TIME	FROM	TO	SUBJECT	REMARKS	INITIALS
04-04							
<p>1940/ 76018 17232 10999 55/// 27154 771// 79130</p> <p>2025/ 16248 16930 2099A 55/// /8263 871// 79120</p> <p>2030/ 76230 16947 2099A 55/// 08277 771// 74420</p> <p>2035/ 76208 17013 2099B 55/// 27175 671// 71120</p> <p>2040/ 76145 17038 1599A 55/// 45166 571// 74420</p> <p>2045/ 76128 17102 0599A 55/// 45153 571// 74520</p> <p>2105/ 76007 17230 10999 55//0 35153 571// 79120</p> <p>2110/ 76003 17236 10999 55/// 35153 571// 79120</p> <p>2115/ 75958 17240 10508 55/// 25252 571// 76140</p> <p>2120/ 76010 17228 15618 55/// 33253 417// 79130</p> <p>2125/ 76029 17209 2050A 55//0 63136 517// 72270</p> <p>2130/ 76036 17148 2099A 55//0 54146 517// 79170</p> <p>3. UNLESS OTHERWISE NOTATED ALL ALTITUDES REPORTED AS 99 = FLT LVL 200. NO RDR REPORTS. NEXT FLT 14 MAR CHUCKCHI SEA.</p> <p>4. AG2 OLSEN SENDS.</p>							
DISTR:							
DRAFTER TYPED NAME TITLE OFFICE				RECEIVED INITIALS			
TYPED NAME TITLE OFFICE				SIGNATURE			
UNCLASSIFIED				UNCLASSIFIED			

DD FORM 173/2

APPENDIX D: REPRESENTATIVE KRMS IMAGES



Figure D1. North coast of St. Lawrence Island (17:21:12Z, 13 March 1988). Flight altitude 20,000 ft (6050 m), 14.4 km across the scene.



Figure D2. South coast of St. Lawrence island (17:26:09Z, 13 March 1988). Flight altitude 20,000 ft (6050 m), 14.4 km across scene.

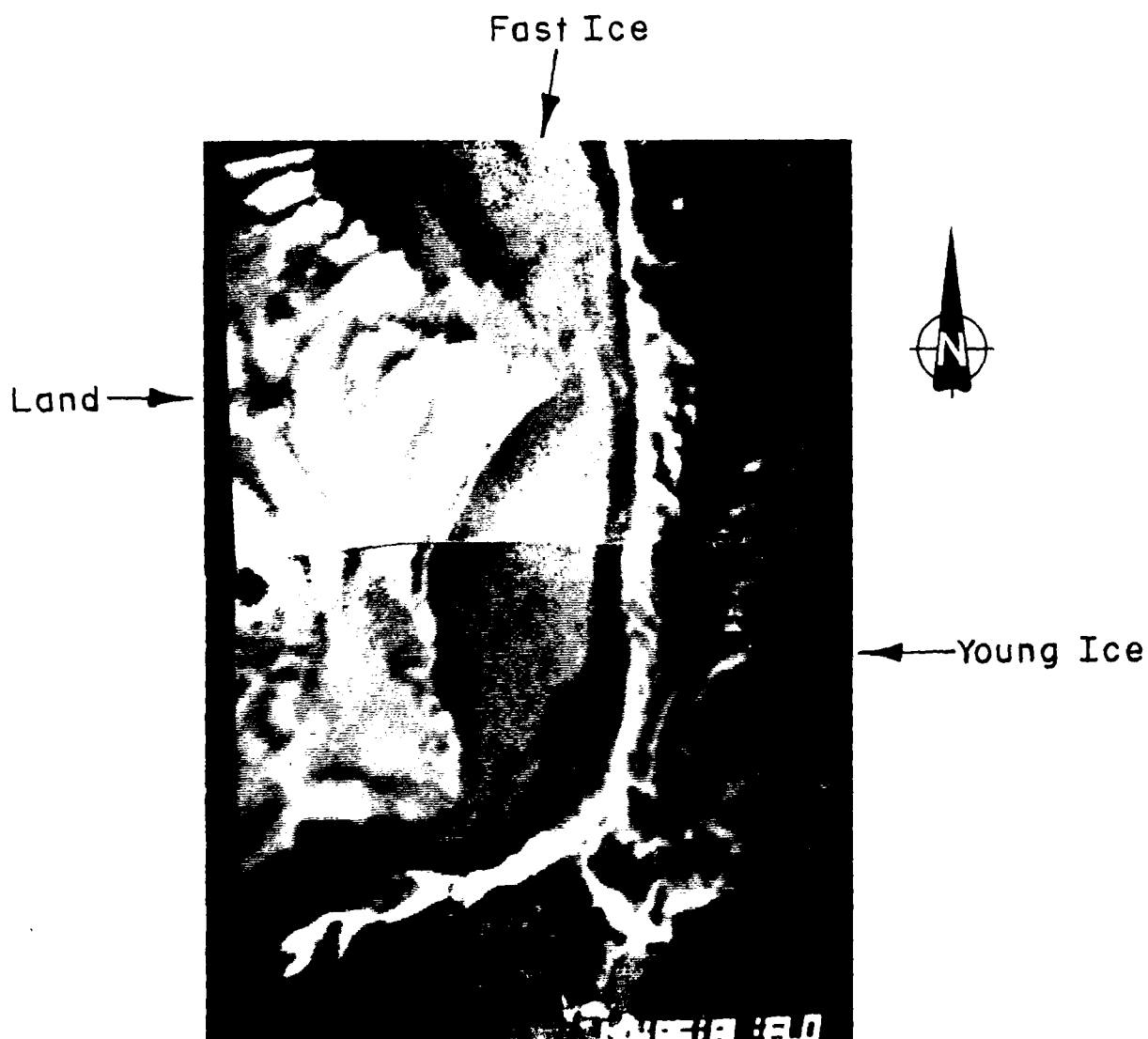


Figure D3. East coast of St. Lawrence Island (18:58:01Z, 13 March 1988). Flight altitude 20,000 ft (6050 m), 14.4 km across scene.



Figure D4. Thin first-year ice and young ice, between St. Lawrence and St. Michaels islands, Bering Sea, Alaska (20:06:14Z, 13 March 1988). Flight altitude 20,000 ft (6050 m), 14.4 km across scene.

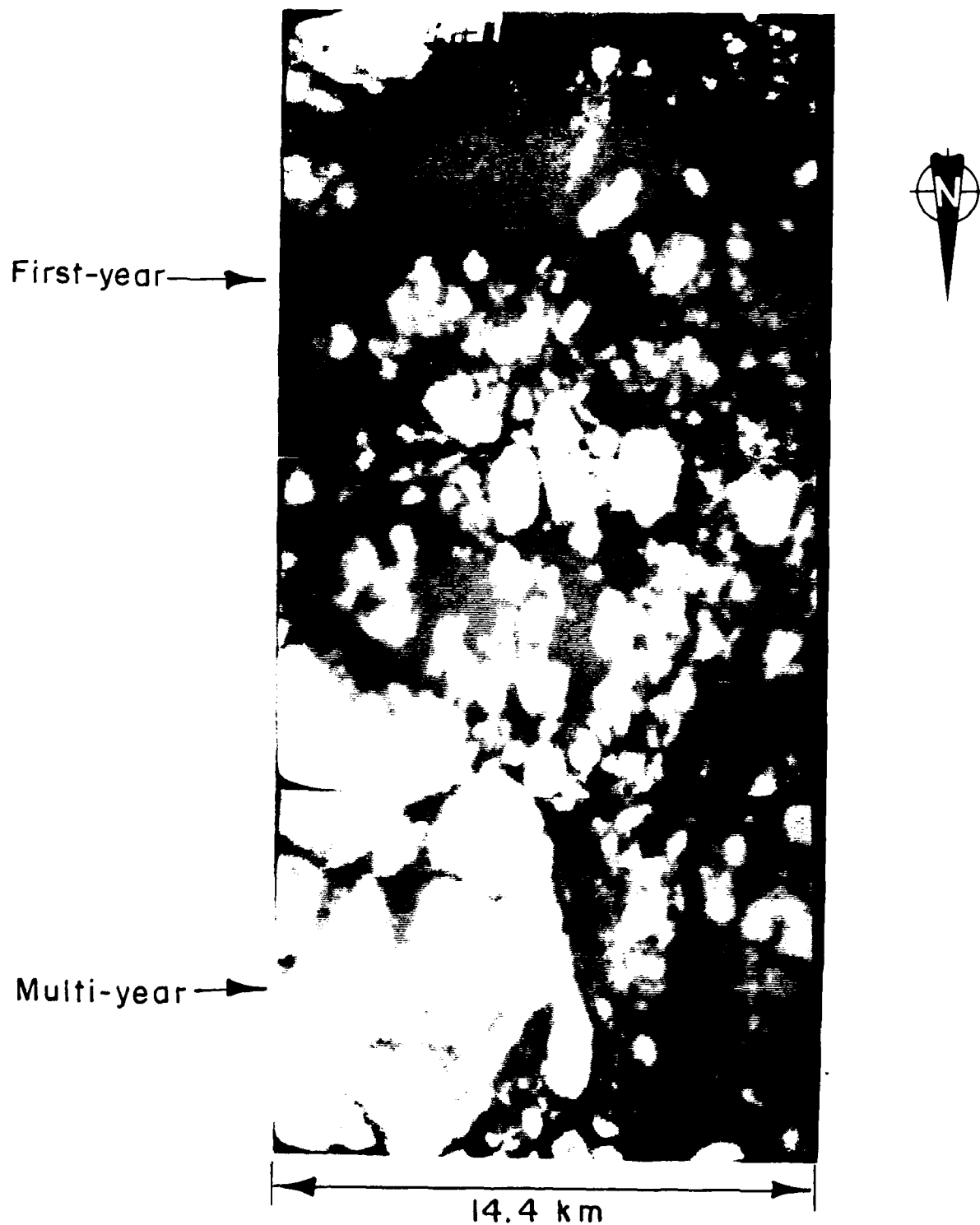


Figure D5. Multiyear ice floes and first-year ice of varying thickness, Chukchi Sea (23:07:57Z, 14 March 1988). Flight altitude 20,000 ft (6050 m), 14.4 km across scene.

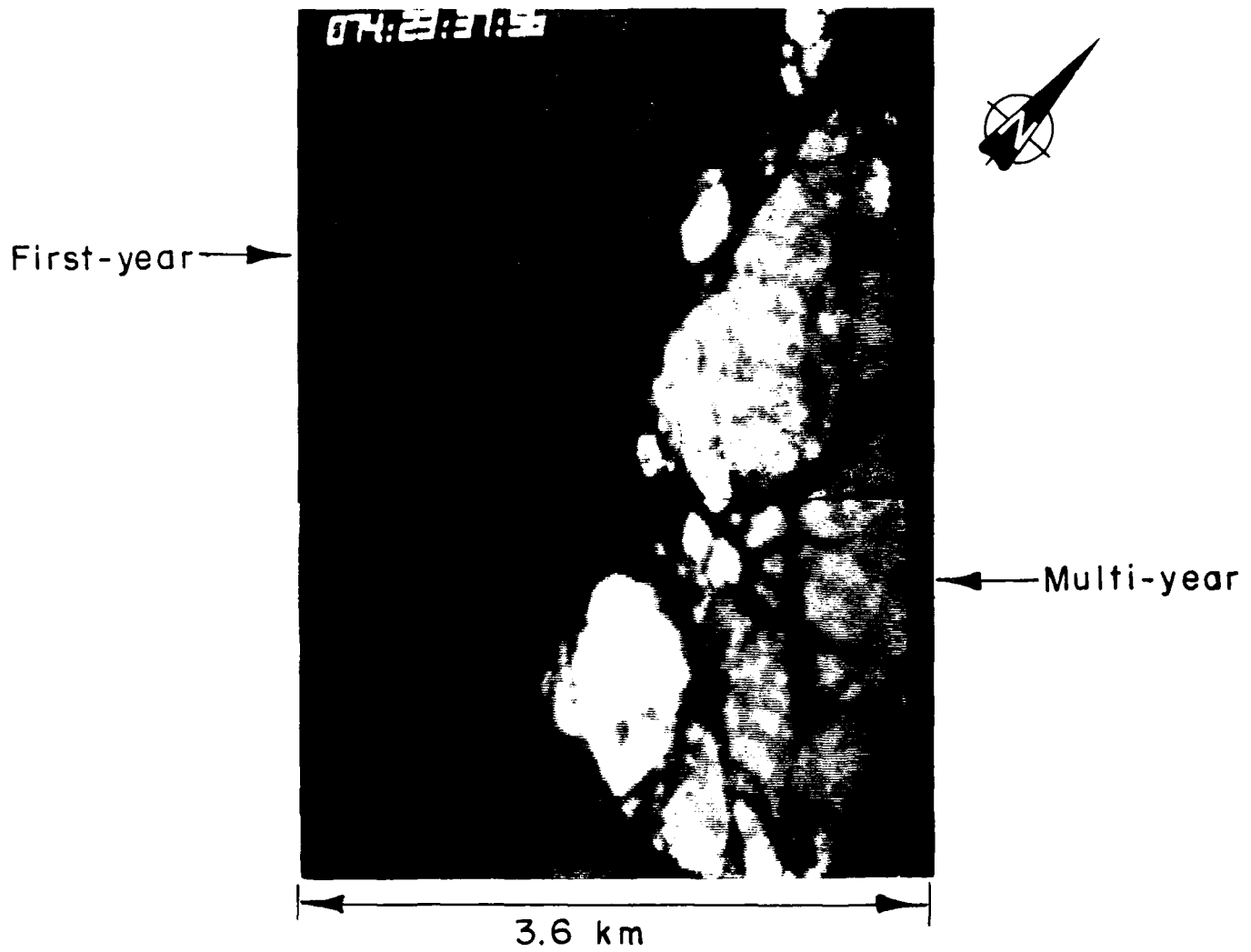


Figure D6. Multiyear and first-year sea ice, Chuckhi Sea (23:37:56Z, 14 March 1988). Flight altitude 5000 ft (1520 m), 3.6 km across scene.

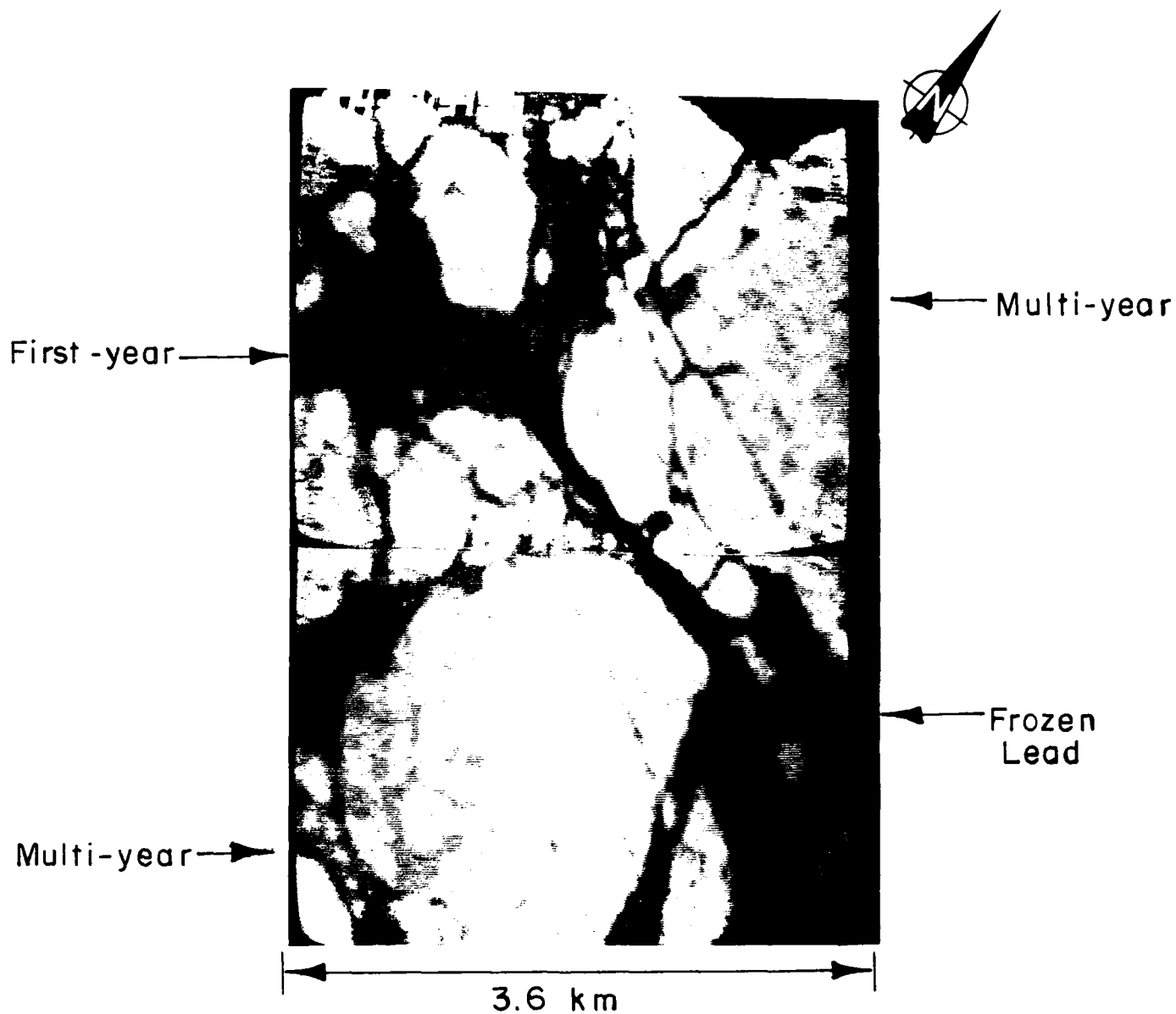


Figure D7. Primarily multiyear ice floes, with a frozen lead (dark linear feature) cutting diagonally across the scene, Chukchi Sea (23:39:22Z, 14 March 1988). Flight altitude 5000 ft (1520 m), 3.6 km across scene.

**APPENDIX E: NAVAL RESEARCH LABORATORY AIRCRAFT
SUPPORT DETACHMENT AIRCREW LISTING**

NAVAL RESEARCH LABORATORY
AIRCRAFT SUPPORT DETACHMENT
PERSONNEL LISTING

CDR H. J. WNUK	PILOT
LCDR C.C.SCHOULDA	PILOT
LCDR D. W. THORNBURG	NAVIGATOR
LT D. G. SEYBOLD	PILOT
LT B. J. MILLER	NAVIGATOR
AMSC F. J. PERETTO	FLIGHT ENGINEER
AD1 M. J. PESCHL	FLIGHT ENGINEER
AT1 W. E. SEARS	AIRCREW
AD1 F. A. JONES	AIRCREW
AT2 T. P. RIZAN	AIRCREW
AT2 D. V. MacCORMACK	AIRCREW
AMS3 T. F. ANDERSON	AIRCREW
MR C. T. "BILL" BENTLEY	PROJECT SUPPORT COORDINATOR